

# AMERICAN FORESTRY

THE MAGAZINE OF THE AMERICAN FORESTRY ASSOCIATION

PERCIVAL SHELDON RIDSDALE, Editor

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APRIL 1917 VOL. 23

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AMERICAN FORESTRY is published monthly by the American Forestry Association.

Subscription price without membership, three dollars per year; single copies, twenty-five cents.

Entered as second-class mail matter December 24, 1909, at the Post-office at Washington, under the Act of March 3, 1879

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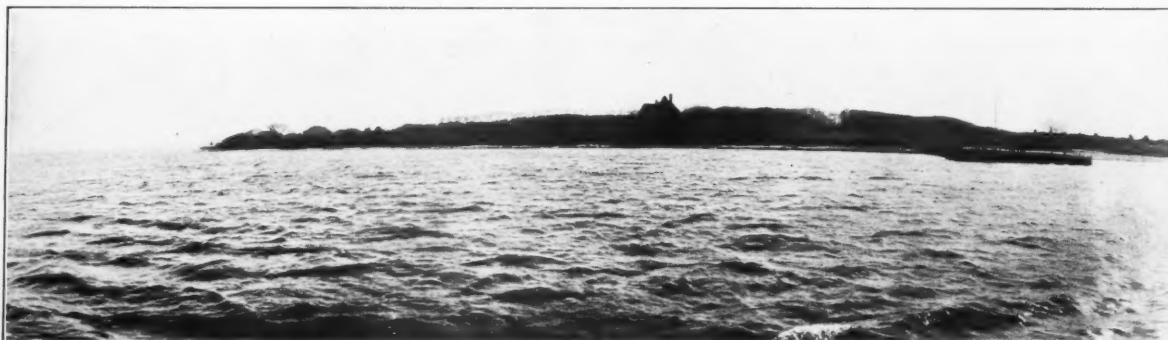
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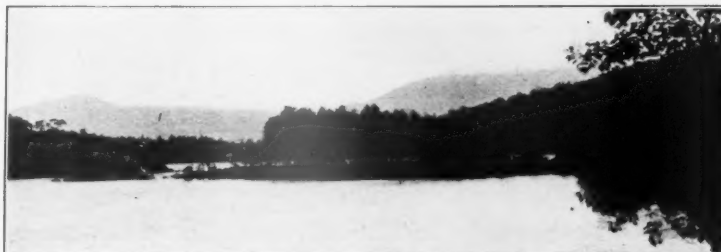
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War - Note change - name this year  
National War Garden Commission

# AMERICAN FORESTRY

VOL. XXIII

APRIL 1917

NO. 280

## PLANTING ONE MILLION FOOD GARDENS

**I**N the existing national emergency the American Forestry Association is "doing its bit." Realizing that the most important feature of economic preparedness is to provide a sufficient food supply, and knowing that owing to the demands from abroad, transportation difficulties at home, and a crop shortage last year there was an actual deficiency in the food supply, the Association has lent the aid of its Conservation Department, its headquarters, and its secretary to the National Emergency Food Garden Commission. This Commission, of which Mr. Charles Lathrop Pack is the president, is for one thing inspiring and aiding the planting of 1,000,000 food gardens in cities, towns and villages. The product of these gardens will supply more than 1,000,000 families, and be valued at \$250,000,000. The members of the American Forestry Association are asked to give their approval and their active assistance in furthering this movement and adding to its success.

**T**HE country's food supply is less than the country's need for home consumption and for export. Something must be done to increase it, and a plan, feasible, rational, simple, has been worked out and given to the people through the newly created National Emergency Food Garden Commission, affiliated with the Conservation Department of the American Forestry Association, which may mean the adding of \$250,000,000 to the annual food supply of the nation. It will mean also the creation and tilling of a million more vegetable-producing gardens in the back yards of thousands of towns, villages and cities of the nation, the utilization of vacant lots and idle land, and the creation of a condition which will enable the civilian population to be helpful to the military arms of the nation.

Charles Lathrop Pack, of Lakewood, New Jersey, president of the American Forestry Association, has been made the president of the National Emergency Food Garden Commission. He is the originator of the Commission and of the idea of a nation-wide campaign for the production of home-grown vegetables. He found upon investigation that there are hundreds of thousands of acres of vacant and untilled lots, neglected back yards, and idle, tillable land accessible to those who might wish to utilize it. He found further that the food supply of the nation was dwindling, that prices for the necessities of life were soaring and destined for still greater altitudes; that if war gripped the nation the great railroad systems would be commissioned for troop and military supply movements, that the products of the farm and stock from the ranch would have difficulty in finding an outlet and that a considerable portion of all foodstuffs would be required for the fighting forces.

Mr. Pack conceived the idea that the home garden, the back lot garden, as an adjunct to the school garden, would

solve the problem. He conferred with eminent men—leaders of thought—and they agreed unanimously that the back yard movement was the solution of the problem, and the National Emergency Food Garden Commission was created.

It was at once affiliated with the Conservation Department of the American Forestry Association, which lent its headquarters and business organization to the work.

The main feature of this work is to supply thousands of newspapers with articles inspiring the planting of food gardens and with a daily service of practical advice on the making and the care of these gardens, the selection of seeds and the cultivation of the vegetables. By this means an average of 10,000,000 people are supplied with daily information for every 1,000 newspapers printing the information. At this time some 2,000 papers are printing the information, which thus becomes available for 20,000,000 people to whom back yards, school gardens or vacant lots are accessible.

Percival S. Ridsdale, secretary of the American Forestry Association and editor of AMERICAN FORESTRY, was chosen as secretary of the Commission. The other members of the Commission are Luther Burbank, perhaps the most noted horticulturist in the world, Dr. Charles W. Eliot, of Cambridge, Massachusetts; John Hays Hammond, the noted mining engineer; Fairfax Harrison, president of the Southern Railway; Dr. John Grier Hibben, president of Princeton; Dr. Irving Fisher, of Yale; Emerson McMillin, of New York; A. W. Shaw, of Chicago; assistant secretary of agriculture, Carl Vrooman; Captain

J. B. White, noted lumberman and conservationist and now a member of the United States Shipping Board; James Wilson, former secretary of agriculture, and Hon. Myron T. Herrick, of Ohio. In this list of men of action may be found the foremost thinkers of America. They are men

### THE NATIONAL EMERGENCY FOOD GARDEN COMMISSION

CHARLES LATHROP PACK, *President*

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HON. CARL VROOMAN, *Ill.*

CAPT. J. B. WHITE, *Mo.*



A FOOD GARDEN IN A SMALL TOWN

Here are the back yards, with side fences torn out, thrown together to make one large garden in order to make possible the use of labor-saving machinery. Thus the whole tract was plowed, which saved much laborious spading, and when the crops were small a horse cultivator was employed, all these operations being paid for out of a joint fund provided by the gardeners. Operations on such a scale are impossible in the more crowded cities, but the picture shows the productivity of food gardens.

who have devoted their lives to the solving of vital problems and whose aim through life has been to master some one given profession that their knowledge might reflect good upon their fellows.

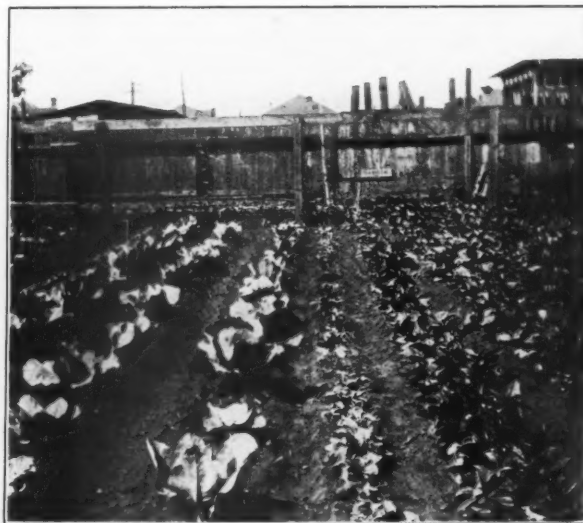
The Commission, immediately following the organization, took up the work of spreading the gospel of food preparedness. Mayors of towns and cities, boards of trade, newspapers and other publications were appealed to and within a remarkably short time the campaign caught the hearty support of the nation as a whole. Mayors of scores of cities have wired the Washington headquarters of the Commission that they have entered the campaign, and in many cities central bodies have been organized to correlate efforts toward successful gardening and to put these efforts on a systematic basis.

Public-spirited men and women are serving on the central bodies, and all over the country city councils, chambers of commerce, boards of trade, mothers' clubs, citizens'

associations, boy scouts, girl scouts, and playground associations have taken up the business of actually getting the nation into condition where it may cease to tremble for food.

Thus has been laid a foundation upon which may be built the future self-sustaining agricultural policy of every American household.

School gardens of course have been maintained in certain communities for years, but the home garden as an adjunct, or rather its significance as a social, an educational, and an absolutely and positively necessary factor, is just beginning to be appreciated by the nation. In most cities



LET'S HAVE 1,000,000 OF THESE

Here is the ideal back yard as seen by the National Emergency Food Garden Commission—cabbages, beets, and turnips in trim, fertile rows instead of lawn, or, as is more likely, unsightly sheds, ashes, tin cans, and rubbish heaps. Give us enough back yards like this and the cost of living will have no terrors for Americans.



AMERICA'S MAN WITH THE HOE—1917

This American man with the hoe happens to be wielding a rake tidying up the paths in a community garden, and his age happens to be 11 years, but nevertheless, in this time of short food supplies and fearful prices, he may be the hope of the nation. There are 4,000,000 graded school children in the United States. Put them all to work in gardens and America's food problem would be solved.



CABBAGES AND KINGS

Some years ago the Walrus got a big laugh with that line, because kings then were so much more important than cabbages. This year kings are a drug on the market while cabbages by the ton bring about the same price as gold ore. If America is to have enough cabbages and other vegetables this year, men, women, and children must turn to and raise them in town and city home gardens.

there are hundreds of acres of land in the form of back yards and vacant lots that might profitably be used for the production of food necessities. In these same cities there are thousands of boys and girls who, with proper guidance, would be willing to utilize this non-productive land. Furthermore, now that the Commission has enthused the nation, these same cities no longer will be importing yearly thousands of dollars' worth of vegetables, but will be raising foodstuffs themselves.

Considering the low average labor income, the amount spent for fresh vegetable and small fruit foods is large, an average outside of large cities of \$138 per year for a family of five persons. About thirty per cent of such families have home or vacant-lot vegetable gardens, but the method of planting and cultivation are not intensive, and the money value of the product is small. But this condition, which existed during the past

## THE FOOD CRISIS

BY CHARLES LATHROP PACK

President of the National Emergency Food Garden Commission and  
President of the American Forestry Association

**T**HE National Emergency Food Garden Commission aims to assist in making food more plentiful in villages, towns and cities by inspiring the planting of food gardens this year. This is a measure of economic preparedness of vital importance. It will release, in case of military necessity, the use of thousands of trains otherwise required to carry food; it will relieve transportation difficulties which even now cause a deficiency in food supplies; it will reduce the high cost of living.

Hundreds of thousands of individuals, thousands of organizations, would raise vegetables in home gardens, school gardens and vacant lots if they were aroused and if they knew how. The National Emergency Food Garden Commission will arouse them and will tell them how. It has secured the cooperation of hundreds of newspapers which will publish daily instruction and advice on when and how and what to plant. It is being assisted by thousands of city and town officials, civic bodies and planting organizations.

We face a national emergency—a food deficiency. The way to meet and overcome it is by enlisting our boys and girls and men and women to plant vegetables on any plot of ground available.

European nations cannot supply their own needs for food—they must buy from the United States. This buying depletes our own supply. Crops were short last year and the year before. Scarcity of labor will make them short this year. The problem is serious. Patriotic Americans wish to help their country. They can best help by relieving the government of this food problem. They can solve this economic crisis and benefit themselves financially and physically by planting food gardens.

Patriotic words are empty air. Patriotic acts alone will help. Plant a food garden and do your part towards the economic victory.

We expect to induce more than one million young people, women and elderly men this year to plant a food garden who have not done so before. This alone should add much more than two hundred and fifty million dollars to the food value of this season's crop. Those who have made such gardens before should increase their efforts.

You are anxious to do something patriotic because you feel that way. You want to help your country. You can plant a vegetable food garden. Are you doing so? Start now.

several years, now will be overcome when it is realized that the need of intensive food gardening is knocking at the door of nearly every home in America.

In twenty of the important cities of the country last year the public school officials, recognizing the importance of the gardening idea, voted appropriations to carry on the work. Philadelphia spent nearly \$20,000; Los Angeles, California, \$19,000; Cincinnati, \$8,000; Pittsburgh, \$7,000; Kansas City, \$5,000; Chicago, \$4,000; St. Paul, \$3,500. Other cities included in the list, and which spent \$1,000 or more in the work, were Portland, Oregon; Crockett, Texas; Cleveland, Ohio; Birmingham, Alabama; Brockton, Massachusetts; Framingham, Massachusetts; Hartford, Connecticut; Marshall, Texas; Milton, Massachusetts; Pasadena, California; Marlin, Texas; Minneapolis, Minnesota; Tampa, Florida.

Minneapolis, since the Garden Commission began its work of education, is at





OUT WHERE UNCLE JOE LIVES

The Darnall boys, Gene and Jack, who are neighbors of the Honorable Joseph Gurney Cannon in Danville, Illinois, and know him familiarly as Uncle Joe, have gone in exclusively for corn in their joint garden, thereby setting at defiance a precept of scientific farming which prescribes mixed crops. However, Gene and Jack seem to be doing well with their corn, which is to be expected in the corn belt. The Civic Federation of Danville is behind the gardening movement in that city. This year many other civic organizations are aiding the home gardeners.

the forefront of the food preparedness campaign with a new method of stimulating interest in the work. Three thousand vacant lots, in addition to back yard gardens, are to be tilled by individuals in the Minnesota city. At the end of summer, after all the gardens have been harvested, a crop festival will be held to which every amateur gardener will be asked to bring specimens of the product he has raised. Prizes and blue ribbons will be offered for the best samples shown. Several other cities are to take up the Minneapolis plan which is expected to develop the same spirit of rivalry among vacant lot and back yard tillers which exists in farming communities through the medium of the county fair.

As a concrete example of what may be accomplished



JACK AND THE BEAN STALK

Jack's name is Mike—last name Kelly—and his curly hair is red. From which it may be gathered that his nature is energetic. Private affairs took him away from his bean stalks so much last year that from an investment of \$4.68 his food garden produced only \$18.56. His next-door neighbor in the school garden tract—a girl, too—profited so much by Mike's horrible example that she made one of the best gardens in town.

through home gardening, the National Emergency Food Garden Commission points out that, for instance, in Chattanooga, Tennessee, in the summer of 1914, nearly five hundred school children tilled 12 acres in back yards, growing \$2,500 worth of vegetables in the three summer months. In the summer of 1916, 718 pupils tilled 13 acres in back yards, and the vegetables grown aggregated in value \$3,786. In Charlotte, North Carolina, 168 children tilled 7 acres and produced \$1,225 worth of vegetables. In Asheville, the same state, school authorities prevailed upon the children to follow similar pursuits, with the result that the little folk produced considerable food-stuffs. So it has been in Raleigh and Lexington, North Carolina; in Augusta and Atlanta, Georgia;





in Lexington, Kentucky; Chester, Pennsylvania; Wilmington, Delaware; Georgetown, and in Michigan, South Dakota, Ohio and other states and cities the movement has made its impress on the minds of the thinking people.

The Commission which has aroused the nation to the realization that millions may be saved annually through the employment of agencies which in the past have been neglected, feels that the future of American agriculture is largely dependent on the boys and girls of today, and it is the purpose of this institution



MAKING DAME NATURE HURRY

With a saw, a hammer and an empty grape juice box, this boy has the equipment which will vie in effectiveness with the expensive hot beds and forcing frames of the scientific market gardener. From the deep box he makes three shallow seed boxes, bores holes in their bottoms for drainage, fills them with rich earth, and plants good seed. Then, if he sets the boxes in south windows of his house, by the time the spring sun warms the outdoor soil he will have thriving tomato plants for his garden.

to assist the other forces now at work to interest, instruct, and direct the youth of the country in the possibilities of garden raising as a profitable and dignified pursuit.

The Commission does not undertake to make an accurate estimate of the value of crops grown in the food gardens of the United States, but from careful investigation it is enabled to say that a well-kept garden will yield a return ten to fifteen times greater than would the same area and location if devoted to general farm crops. A little work and a little land will easily



THE COÖPERATIVE GARDEN

Here in a Massachusetts town we see the neighborhood coöperating in a garden, the cheapest and easiest plan. Coöperative funds paid for the plowing and fertilizing of the lot and then the individuals planted whatever they chose and took care of their own crops. The National Emergency Food Garden Commission is calling this plan to the attention of apartment house dwellers who can have access to large vacant lots.



HELPING OUT IN THE LIVING PROBLEM

This boy has a task better for himself and more profitable than selling newspapers to help out his father's weekly pay envelope. His garden, on land the use of which he got for the asking, is the pleasantest spot in this dreary street of workmen's houses, and the most productive, for it furnishes the vegetables which his hard-working mother would have to buy at high prices or go without.

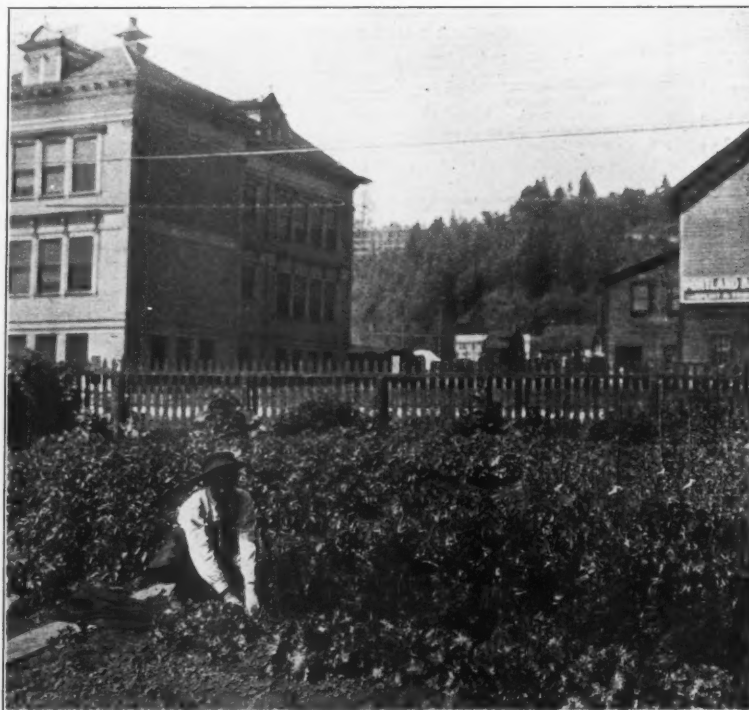


A BOUNTIFUL HEDGE

In the smaller towns where lots are broad and deep and vacant property plentiful the larger garden is advised by the National Emergency Food Garden Commission. The family living on this beautiful, shady street has a garden which provides its every food need so far as fresh vegetables are concerned. The details of this garden are concealed from the street by a hedgerow of corn, which not only is pleasing to the eye but produces luscious ears of green corn.

supply a family with \$100 worth of vegetables during the year. And the Commission feels that a bountiful supply of vegetables close at hand where they may be secured at a few moments' notice is of even more importance than the mere money value.

Men who are looked upon as the ablest trained thinkers identified with conservation problems of the country, believe in the wholesomeness of home-grown vegetables. They point out that fresh vegetables from the home garden are not subjected to ex-



A FRONT YARD GARDEN

Across the street the school house spreading the garden propaganda. Factories of the scattered suburban type in the vicinity. The cottage, standing well back in a broad lot, looks upon its neighborhood not across a lawn but over an exceptionally abundant garden. In his zeal for gardening this boy induced his father to tear out the wide front walk and substitute a narrow plank to give greater room to the garden. The picket fence (or a wire one) is much better for gardening and the looks of the city than a tight board fence which often conceals untidy yard conditions.

posure on the markets or in transportation and are not liable to become infected in any way. Many of the garden products lose their characteristic flavor when not used within a few hours after gathering. By means of the home garden, the production of the vegetable supply for the family is directly under control, and in many cases is the only way whereby clean, fresh produce may be secured.

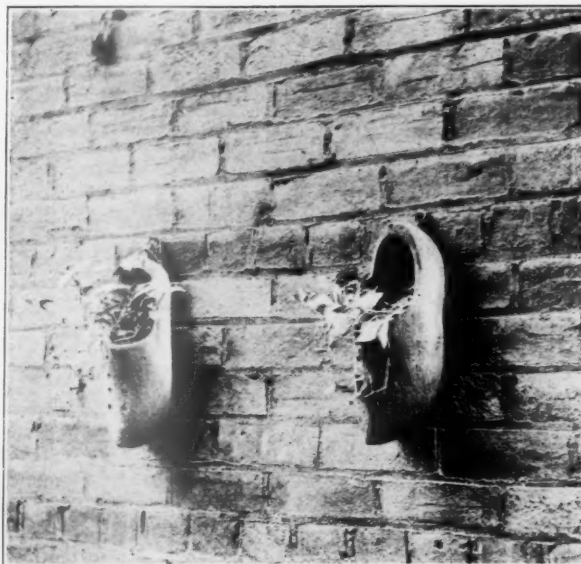
In the cities, towns, manufacturing villages, and suburban communities of the United States there are approximately 13,000,000 children between

the ages of 6 and 20 and if this small army takes up the hoe and the rake and plants food gardens the food problem becomes no problem at all.

It is not difficult to estimate the benefits to mankind once the plans of the Commission are in full operation throughout the country. For the children it will mean health, strength, joy in work, habits of industry, and understanding of the value of money as measured in terms of labor and such knowledge of the phenomena and forces of nature as must be had for an understanding of most of their school lessons. They will also learn something at least of the fundamental principle of morality, that every man and woman must make his or her own living; must, by some kind of labor of head, hand or heart, contribute to the common wealth as much as he or she takes from it; must pay in some kind of coin for what he or she gets.

President Pack also believes that the economic and sociological results are worthy of consideration. Experiments already made show that with proper direction an

the nation is mainly dependent upon the productive powers of its people. Business and professional men appreciate the value of recreation, but oftentimes neglect it for lack of interest. If such men understood the principles of



GARDEN SABOTAGE

No back yard for gardening, this tenement child has her pathetic little garden anyhow—in an old pair of wooden shoes, or sabots. For the benefit of those who have the gardening desire but not the land the food garden movement is being aided in many cities by owners of vacant property permitting its cooperative cultivation by volunteers.

gardening, they would find sufficient incentive to exercise and would take much pleasure from work in the home garden during the evening hours.

With precise knowledge at its command, the National Emergency Food Garden Commission gives the following advice on the location of a garden:



BACK YARD BLUE RIBBONERS

The rural county fair no longer has the monopoly of lettuce heads 21 inches in diameter, nine-pound cabbages, and one-pound beets such as the young planter on the right is holding. These products, which would take blue ribbons against the best entries of the professional gardeners, were raised on city back yard gardens.

average child of reasonable years can produce on an eighth of an acre of land from \$50 to \$100 worth of vegetables. A third of the children in the city schools of the United States might easily produce the \$250,000,000 worth of foodstuffs which is predicted by the Food Garden Commission can be added to the annual crop supply if 1,000,000 more gardens are planted this year than were in existence last season.

Aside from the fundamental and essential reason why the nation should take up whole-heartedly the Commission's injunction to produce, and produce at once, the fact that a generation of men and women would be produced who would find their recreation, after the close of their labor day of eight hours, in profitable home gardening, is a phase of the situation which should commend itself to everyone. A man's worth is measured largely by his ability to produce, and the wealth and prosperity of



FOOD INSTEAD OF FLOWERS

When you have no land, but live in a tenement with a concrete yard, the best you can do in gardening is in the window box. And if you are homesick for the taste of vegetables crisp from your own garden, you plant the window box to corn, beans, and radishes, such as are growing in this window garden, instead of flowers. The National Emergency Food Garden Commission urges owners of vacant lots to donate them for free garden use to those who wish such an opportunity.





## WASTE MADE USE

Before these boys and their garden instructor carried their tools and vegetable seeds upon this vacant lot it produced nothing but weeds, which scattered their seeds over adjacent lawns. Now it is giving a large measure of economic independence to several families, in addition to improving the quality of their food. "The waste of vacant lands in and about American cities, particularly in the East, is appalling," wrote Albert Shaw, editor of the *Review of Reviews*, to the National Emergency Food Garden Commission.

"The question of proximity to the house should be given first consideration. As the work of caring for the garden is usually done in spare time, the location selected should be as near the house as possible. The slope and type of soil should be the next consideration. A slope to the south or southeast is usually preferable, because here the soil warms up early in the spring, which permits early planting and stimulates the early growth of crops. Practically any type of soil can be used for the garden, but a sandy loam is to be preferred.

"Good drainage is of prime importance. The land should have sufficient slope to drain off surplus water during heavy rains, but the slope should not be so great as to wash the soil. If the land near the house is level, artificial drainage should be employed. Open ditches or tile drains will be satisfactory. On level land that is not artificially drained it is necessary to plant on ridges or in beds to prevent drowning the crops during wet weather. The ridges or beds should be as wide and flat as conditions will allow, for narrow, sharp ridges dry out quickly.

"In planning the location of crops, consideration should be given to the matter of succession, in order that the land may be occupied as large a part of the time as possible. It is not advisable to have a second planting of the same crop or a closely related crop follow the first. For instance cabbage should not follow cauliflower, Brussels sprouts, mustard, or kale, for many of the same diseases and insects affect all of these crops. Tomatoes, egg-plants, and peppers should not follow each other. In some sections of the country two crops can be grown on the same land each year, while in other sections three or four crops can be grown to advantage."

The Commission is spreading its campaign throughout the country, and the press of the nation, furnished daily with bulletins and other information for the guidance of the amateur gardeners, is aiding the Commission in a laudable manner. It is realized only too well by the men behind the movement that it is not so much a question of production but a question of transporting the foodstuffs. This difficulty confronts the country even today, and with a declaration of war the government heads say most positively that the trains could not be utilized for transporting food supplies across the continent.

President Pack believes that it is the patriotic duty of every man in the United States who owns or controls land to plant and cultivate it. He has studied the conditions in Europe closely and with that dreadful picture of hunger and starvation before him he feels with every government official that no time should be lost in arousing the nation from a lethargic condition to one of bustling vigor, and his plea is to plant food gardens at once. He explains that no campaign of his knowledge has met with such instant success as the food garden plan of the Commission.

"But the work has just begun," he adds. "There must be a million recruits to the army of home garden makers. Wherever there are no clubs they should be formed to foster the work. Effort of any kind seems to be more successful where the individual feels that his neighbor is working with him. There must be no letup in the work started throughout the nation. American cities are to be put to the supreme test—their vacant land must be made to produce a large portion of the vegetables that they consume."



## FORESTRY AND THE PAPER INDUSTRY

BY HONORABLE D. F. HOUSTON  
SECRETARY OF AGRICULTURE

CONDITIONS in the paper industry have constituted one of the most serious of our domestic problems during the last year. Due to the exorbitant prices charged for news print, the profits of the great dailies were either wiped out entirely or else reduced to a minimum, while the small publishers were brought face to face with suspension and even absolute ruin. Periodical publishers have fared no less badly, the profits of book publishers have changed to losses in many cases, and the price of paper of every kind has risen by leaps and bounds.

The Federal Trade Commission has brought some measure of relief to the newspaper publishers. Competition has been freed from restraint, prices have been made to bear a closer relation to the cost of production, and a more equitable system of distribution has been devised so that the "little fellows" will get their fair share of the manufactured product. But, while the inquiry of the Com-

mission developed artificial control, it developed also that there is almost an *equal balance* between supply and demand in the paper industry.

In 1914, we used about 5,000 tons of news print every day. Our present use has reached 6,000 tons a day and the demand appears to be increasing at the rate of 10 per cent a year, materially faster than the increase in population. To supply our presses with news print requires annually about 3,000,000 cords of pulpwood. To meet our requirements for magazine and book paper, stationery and business papers of all forms, wrapping papers, wall papers, cardboard, fiber board and the like, 4,000,000 cords more of pulpwood are consumed annually. Production barely keeps pace with this consumption. For instance, the estimated demand for news print for the first six months of 1917 is 888,000 tons. Against this is placed an estimated supply of 930,000 tons.



THE GLENS FALLS BOOM, GLENS FALLS, NEW YORK

Pulpwood in the Hudson River on its way to the paper mill, indicating in a small measure the vast quantities of pulpwood taken from the forests of northern New York to be made into print paper.

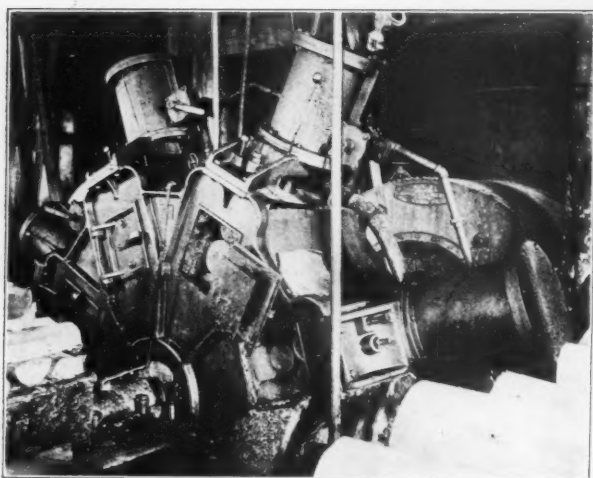
As if this close balance was not peril enough, there is the added fact that the United States depends upon Canada for a third of its news-print paper, either in the form of finished product or raw material. This proportion is increasing rapidly. The pressure of economic conditions and lack of foresight in cutting the forests have so depleted



BEATING OR MIXING MACHINE

The different ingredients which are used in the manufacture of the sheet of paper are put in these tubs, where they are thoroughly mixed and refined by passing the stock between a revolving roll filled with knives, and a stationary plate made up in a similar manner. This process takes place just before putting the stock on the paper machine.

the available private supply of pulpwoods in many of the paper manufacturing states that there is not enough left to last more than ten or fifteen years. As a consequence, Canada is more and more called upon for pulpwoods,



MECHANICAL WOOD PULP GRINDER

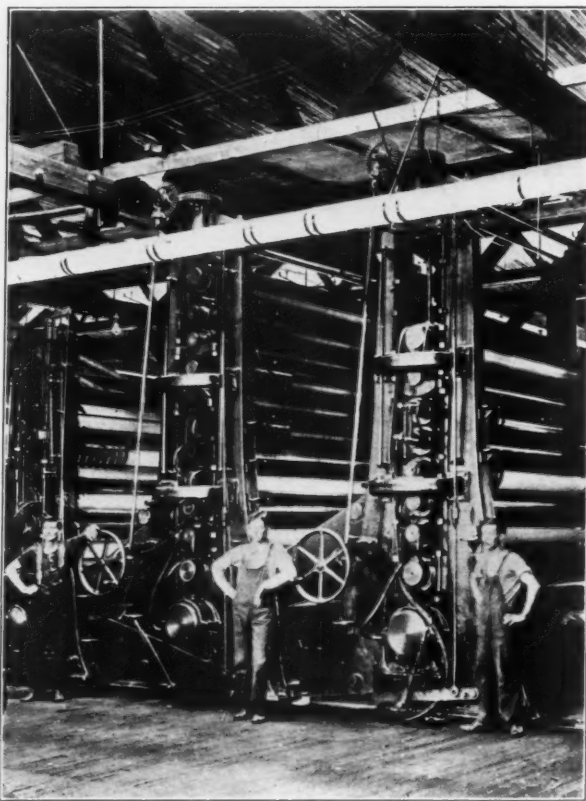
This machine reduces the wood blocks to fine fiber, hydraulic pressure holding the blocks against a revolving sand-stone.

and American manufacturers are showing an increasing disposition to slip across the border into the virgin forests of the Dominion.

It is this condition of dependence that should be ended. Changes in Canadian policy might at any time cut off our newspapers from this source of supply or make it available only at excessive cost. On the other hand, our own forest resources are ample to meet all the paper requirements of the country. Aside from the waste materials produced in the manufacture of lumber and the possible growth on 65 or 70 million acres of cut-over forest lands in the Northern States, the publicly owned National Forests contain enough pulpwood to supply the entire paper needs of the United States for the next eighty years. Cut intelligently, it constitutes virtually an inexhaustible supply for all time.

#### RAW MATERIALS AVAILABLE IN THE WEST

The Forest Service has estimated the pulpwood in the National Forests at three hundred billion feet. This



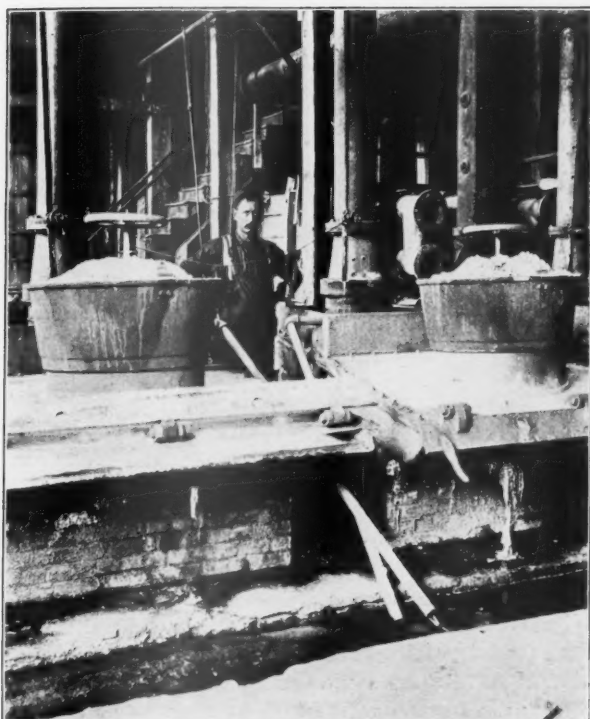
THE PAPER-MAKING MACHINE

This illustration represents the finishing end of a paper machine. The stacks of chilled steel rolls shown in the illustration are used for surfacing, or, in other words, ironing the sheet of paper to a smooth surface. The lower section of the machine represents so-called reels, slitters and winders. Here the paper is trimmed into the desired widths.

means six hundred million cords, and for all paper of all kinds we use but seven million cords a year. There are other large supplies of pulpwood on privately owned lands in the West. These western raw materials are much cheaper than the woods now used by paper mills in the Northeast. While pulpwood stumpage in the Northern States costs from \$2.50 to \$5.00 per cord standing in the forest, first-class western timbers are available at prices ranging from 25 cents to \$1.50 per cord. Long-distance transportation and the large investments tied up in paper

plants necessarily will retard the westward expansion or migration of this industry; but unquestionably it should afford one means of increasing the production of paper to keep pace with current demands.

From the standpoint of geographical location and transportation to the bulk of the paper users in the Central and Eastern States, the western paper woods fall into two broad belts. The first is available to tidewater shipments from the Pacific Coast, lying principally on the west slope of the Cascade Mountains in Oregon and Washington, including vast areas tributary to Puget Sound, and running up along the seaboard in southeasterly Alaska. There are 70 billion feet of spruce and hemlock in the National Forests of Alaska alone. In many respects, its condition as to abundant forests of paper-making woods, water power, and direct tidewater transportation duplicate those of Norway, the leading country of the world in its paper industry. It is a safe prediction that in the



SULPHUR BURNERS

These burners are used in the acid plants of the sulphite or chemical pulp mills or generating the sulphur gases, which are combined with milk of lime for the manufacture of liquor, used in combination with steam pressure, for reducing the wood, which is in chip form, to chemical fiber.

last analysis the value of Alaska to the United States as a source of paper will be found to exceed the value of any other of her enormous resources, coal, minerals, or fisheries.

The second timber belt of western paper woods extends through the northern Rocky Mountains from the Canadian line into Colorado and Utah. This belt, shut off from water transportation, can hardly be considered a practical source of supply of paper for the Eastern States; but is a logical storehouse of raw materials for the paper requirements of the Mississippi Valley. The Rocky Mountains contain a number of excellent paper woods and,

with proper development, should supply both the paper required for local consumption and that necessary to replace the diminishing supplies of the Lake States for the needs of the Middle West.

#### NEWS-PRINT PAPER FROM NEW VARIETIES OF WOOD

Extending the supply of raw materials by determining the paper-making qualities of new woods is an important factor in the problem. Tests conducted by the Forest Products Laboratory of the Department of Agricul-



NORTH CLEAR CREEK FALLS

The natural fall shown in the picture was included in a power project for which application has been made by F. W. Bosco, Rio Grande National Forest, Colorado. This indicates character of water powers on National Forests.

ture have demonstrated the suitability for various grades of paper of no less than twelve new or little used woods, including Englemann spruce, lodge pole pine, white fir, and other cheap and abundant coniferous woods of the Western States. At least ten of these woods were proved good enough for news print, and papers made from some of them actually were used in editions of the *New York Herald* and *St. Louis Republic*.

Almost equal in importance to the timber of the Pacific Coast belt and the Rocky Mountain belt are the publicly owned water powers, a second primary essential of the paper industry. Undeveloped power is there in sufficient quantity and available for exploitation and use under reasonable measures of Government control. This is equally true with respect to coal, almost as important in paper manufacture as pulpwood itself. Both in Alaska and in the Rocky Mountain region the Federal Govern-





ON THE COPPER RIVER, ALASKA

The prevailing type of combination of water, forest and mountain scenery in Alaska. It is country like this that may supply much of the pulpwood used in the future and which, if need be, can also supply the water power for paper mills.

ment owns great coal fields of tremendous richness, abundantly able, so the experts report, to supply every National need for many years. The one problem to be faced is that of the best means of utilization. How may our tremendous natural resources be given the quickest and most effective relation to the National needs?

The first plan is that of public sales of raw material to the manufacturers. This already is being done to some extent. During the last year National Forest timber sales to lumber companies, railroads, and mining companies and one western paper mill amounted to \$1,795,000. This plan calls for contractual relations between the Government and private capital. New mills might be erected in Alaska, the Puget Sound country, or the Rocky Mountain region, under agreements with the Government for a long term supply of raw material, guaranteed under an equitable adjustment of prices from time to time. This already is being done in the case of certain saw mills. Such contracts may readily contain provisions which give the public effective control of possible industrial combinations or monopolies.

#### PRACTICABLE TO MANUFACTURE NEWS PRINT IN ALASKA

Experts of the Forest Service report that it is entirely practicable to manufacture news print in Alaska and deliver it to New York through the Panama Canal at a cost of not more than \$35 a ton. When it is considered

that recent prices have ranged from \$60 a ton upward, it is evident that an excellent competitive basis exists for the introduction of western papers.

The development of private paper plants in the West might be supplemented by the erection of mills by the Federal Government itself. It is estimated that a mill with a capacity of one hundred tons of news print a day can be built in Alaska for two and a half million dollars. Even if the output of the mill was confined to the needs of the Government alone, it is probable that such a mill would pay for itself in no great length of time, while adding something to the paper supply of the nation.

#### SHOULD THE FEDERAL GOVERNMENT ENTER THE INDUSTRY?

The fundamental problem is to build up paper production in the United States to keep pace with a growing demand and afford a sufficient supply at all times to hold prices at reasonable levels. To the extent that private enterprise will do this, it would appear unnecessary for the Government to undertake it, particularly if the publicly owned forests can be utilized for the purpose under conditions which give the public control of industrial organizations. In the event that private capital cannot be enlisted, however, to meet the needs of a larger paper supply available at fair prices, it may be well that the Federal Government should enter the industry as a direct method of controlling the situation.



These are the larger aspects of the situation. There are certain direct and simple approaches, however, that call for nothing more than greater economy. The waste which now occurs in the manufacture of lumber is estimated by the Forest Service at something over 60,000,000

often sell their hemlock slabs to paper mills for from two to three dollars per cord. This is a form of conservation that should be given speed and drive.

So much for the immediate problem of supplying the paper requirements of the United States to-day. For the

second phase of the problem, that of an assured future supply of paper within our own borders, there is only one solution: *the practice of forestry to keep up a continuous production of pulpwood.* There is nothing difficult about this solution if the latent producing capacity of the forest lands in the United States is utilized. There is no reason why the regions now supporting large paper-making plants should not do so permanently, as Norway does, if the native resources of those regions are but properly organized and intelligently used. The production of pulpwoods, in fact, offers one of the best opportunities for forestry in the United States because small, quickly-grown material can be utilized for this purpose, and because many of the fastest growing trees, like poplar or Norway spruce, are adapted to it.

With intelligent cutting and protection from fire, the land will restock itself. Unintelligent cutting that "skins" the



NATIONAL FOREST POWER PLANT

Colorado River Company's power plant on Grand River, showing power house building, and spillway flume. This is located on the Holy Cross National Forest, Colorado.

cords annually. At least 40,000,000 cords consist of coniferous woods, a part of which is suitable for the manufacture of various grades of paper, although the cost of assembling it in sufficient quantities to support a paper plant is often prohibitive. Experiments at the Forest Products Laboratory show that much of this waste can be utilized for the manufacture of kraft wrapping papers, fiber board, and other pulp products. In the case of saw mills that cut up spruce, hemlock, etc., the waste can often be gathered and shipped with profit to news-print mills.

The use for pulp of waste material left after lumbering has recently been introduced in lumbering operations in Pennsylvania and parts of the South. Hemlock tops and broken, defective logs are peeled in some Pennsylvania lumber camps, cut into five-foot lengths, and sold for pulpwood. From 250,000 to 260,000 cords of slab wood and other mill waste are now consumed every year for pulp. In 1908, hemlock formed 41 per cent of the saw mill waste used, and its average value was \$4.07 per cord, about two-thirds that of hemlock cordwood in the round. In Wisconsin, saw mills



SHIPPING ALASKAN LUMBER

The weight of the lumber broke down the Hadley Dock in Alaska. The steamer Melville Dollar is lying in front of the dock. This was the first full cargo of lumber to leave Alaska. It comprised 1,200,000 board feet.

land, however, may call eventually for artificial reforestation. Denuded land can be planted with 1,000 young trees per acre, nursery grown, at a cost of about \$10 per acre. Some of the paper companies in New England are acquiring and protecting large areas of forest land, many



POWER AND PULPWOOD COMBINED

Waterfall at head of E-gal-ik Bay, Prince William Sound, Alaska, a possible source of power for a paper mill and dense forest of pulpwoods on the mountain side.

of them culled or cut over, in order to insure a future supply of raw material to protect the enormous investments represented by their paper plants. In a few instances, a limited amount of planting has been done. Considerable areas of inferior pasture land, worn-out farms, and the like in New England have been restocked with trees, either through a gradual reversion to forest by natural causes or by artificial planting, because their owners have realized that these lands of low value could be utilized to the best advantage for producing wood.

In other sections, like considerable portions of the Lake States, reforestation is not coming about through economic development, or is coming about so slowly that it will be far behind the need of forest-using industries for raw material. In such regions public initiative and enterprise must take the lead. Probably the greatest need is for an intelligent, far-sighted administration of the forest lands now in public ownership, in one form or another, and for the addition of cut-over forest lands of low value to the

public holdings, state and Federal alike.

Practically all European countries have found that a considerable body of publicly owned forests was essential in working out their problem of keeping up continuous forest production. The United States will prove no exception to this rule; and the building up of state and Federal forest holdings, under expert, non-partisan administration, is one of the most important steps to insure a future supply of paper as well as other basic forest products.

On the 165 million acres of Federal forest holdings in the National Forests, the timber is being used under scientific methods of cutting as there is demand for it and the lands denuded by old fires are being reforested by planting to the extent of 20,000 acres annually. Federal holdings also are being extended by purchase in the Eastern States, under the Weeks Law, for the protection of navigable streams.

#### STATE FOREST RESERVES

A number of states have made valuable beginnings in this direction. Pennsylvania has acquired state forest reserves aggregating more than a million acres and consisting largely of culled or cut-over lands which the State has been



AN ADIRONDACK FOREST

Heart Pond and Mount McIntyre from Mount Jo. Typical Forest clearly shown; mixed hardwoods on lower levels with balsam fir and red spruce on margin of pond. Spruce and balsam dominate on higher elevations.

able to purchase at low valuations. New York has extensive state holdings; Wisconsin and Michigan both have small areas; Minnesota recently has passed a constitutional amendment which will permit the creation of permanent state reserves. All these efforts, in the aggregate, fall far short of the need. Particularly in the Lake States, in whose early economic development forest resources probably had the largest part, there is a general lack of an intelligent public conception of this problem and of adequate measures toward its solution.

The right kind of land ownership is fundamental in working out the problem of a sustained supply of lumber, paper and other essential forest products. There must be a stable interest which insures permanent forest production. This may be supplied by general economic development. Otherwise, it must be supplied by the farsighted point of view of the community, either through direct public ownership or a sufficient measure of public control to secure the results necessary.

An immediate necessity in the accomplishment of this object is to build up the forest departments of the various states—to get behind fire protection, to push reforestation of state lands, to demand acquisition of permanent forest reserves, and to support expert investigative work in forestry. Expert classification of receded



ALASKAN SPRUCE FOREST

At Fish Bay on the Tongass National Forest, Alaska, is the pure spruce stand shown in this photograph. It could well be used for pulpwood.



TYPE OF ALASKAN FOREST

A log boom at Whitewater Bay, Admiralty, Alaska. It is this kind of forest which can furnish quantities of pulpwood in the future.

tax lands should have an important place in this development. Cut-over lands not suited to agriculture or which have a low or questionable value for tillage should be kept by the states and added to their forest reserves so that an aggressive public policy of reforestation may be pursued. This is one line of attack upon the vital and general problem of how to put all classes of land to their most productive use.

Another thing that must be brought about is full recognition of the public interest in *all* forest lands. It is not enough that the state should look after its own holdings; it must extend its authority to the management of private holdings as far as may be necessary to meet public needs. We must recognize, in other words, that forest lands have, in a measure, the nature of public utilities.

A first step in such regulation is compulsory fire protection, the starting point of forestry. Not only, however, should each landowner be required to do his

share in preventing or suppressing forest fires, but the public itself should cooperate by furnishing the necessary machinery for correlating and directing this work as a whole. The State of Oregon has taken an advanced step in this direction, through a law making the protection of timbered lands obligatory upon their owners and authorizing the State Forester to protect lands whose owners fail to discharge this duty.



The cost of such protection, within limits prescribed by the act, becomes a lien against the property. At the same time the state itself expends a considerable sum for a system of fire wardens upon which the entire protective organization is built up and correlated.

In many cases, the protection of cut-over forest lands from fire is sufficient. In other cases it should be supplemented by the enforcement of simple forestry measures, such as the disposal of slashings and the regulation of cutting to make certain that the land will be left in a condition which will insure its regrowth.

#### TAXATION OF FOREST LANDS

With public regulation, however, should go a vigorous encouragement of private owners to keep their forest lands continuously at work and thus do away with the economic loss represented by the idleness of millions of acres of "skinned" land. Such encouragement is justified by the community benefits afforded by the reforestation of private lands and the burdens imposed upon their owner

in deferring income from them. The community may share in these burdens, as it shares in the advantages of reforestation, by applying the yield, or harvest, tax to forest lands which are properly managed so as to meet their public obligations. The owner thus will be released from the burden of annual property taxes, paying instead a tax on the returns from his property at the intervals when its wood crops are harvested. This concession, of course, should apply only to owners whose lands are kept in continuous forest production.

A number of the states have taken progressive steps in accord with some of these suggestions. Their local forest departments furnish the ground work for building up and expanding the forest activities of the state. The Department of Agriculture also stands ready to give aid and encouragement. Experts of the Forest Service are available to advise with state legislatures regarding forest legislation and to cooperate with state commissions or local associations of citizens in developing the forest policy of the state.

## NEBRASKA'S FORESTATION COMMISSION

BY WOODRUFF BALL, SECRETARY

THE State Forestation Commission of Nebraska has drafted for presentation to the Legislature, four bills. One provides for the creation of a permanent Forestry Commission; one for an exchange between the State and Government of the State school lands upon the present National Forest Reserves; two will permit of the counties, cities of all classes and villages of the State establishing and maintaining municipal or communal forests, with power to vote bonds for their purchase and levy taxes for the maintenance thereof, the intent being that these communal forests may also be used for public park purposes and a protection of the potable water sources. The Commission has taken this step in hopes of thereby awakening an interest in similar work on the part of the State Government itself.

The Commission was created in 1913 to investigate the feasibility and desirability of afforesting the State school lands in Western Nebraska, that region of the State which is commonly termed the "Sand Hills." The members are Carl Rhode of Columbus, A. H. Metzger of Rolf and Woodruff Ball of Valentine.

After a careful survey of conditions, the Commission shortly following its appointment arrived at the conclusion that at that time the forestation of the school sections or State land was not feasible owing to the fact that these State school lands were in isolated tracts of 640 acres each. Wherefore, the cost of planting and maintenance would be prohibitive. They further found that in view of the work accomplished by the Government Forestry Service upon its two reserves in Western Nebraska, to wit, the Bessey Division and the Niobrara Division, that under proper conditions such a policy as

was contemplated in the resolution could be carried to a successful conclusion.

In the forepart of 1914, the Forestry Service had under consideration the elimination of the Niobrara Division in its entirety and parts of the Bessey Division from the Nebraska National Forest areas. The Commission was able to but demonstrate to the Forestry Service that it was inadvisable to do so and was able to secure an additional appropriation for the Forestry Service which has enabled it to establish upon the Niobrara Division a second nursery to be used in connection with their operations upon this Division. The Commission further secured a soil survey of the two Divisions which conclusively demonstrated that the lands embraced within these Divisions could not be classified as agricultural land and hence was not available for homesteading purposes. This, in view of the additional fact that the Forestry Service is meeting with great success in its plantations, has doubtless put an end for all time to the question of further eliminations.

The Commission, recognizing the fact that the late Dr. Charles E. Bessey of the Nebraska State University was primarily responsible for the establishment of the Nebraska National Forests, felt that it would be a most fitting memorial and monument to Dr. Bessey's memory to name for him one of the Divisions. Acting upon their suggestion, the Forestry Service last fall officially designated the former Loup Division and Halsey Nursery as the Bessey Division and Bessey Nursery of the Nebraska National Forests. The Commission has now made a further suggestion to the Forestry Service that it designate the Niobrara Division and Niobrara Nursery as the Morton Division and Morton Nursery in honor of the late Honorable J. Sterling Morton.



# THE INDEPENDENCE OF AMERICAN NURSERIES

BY DAVID FAIRCHILD

AGRICULTURAL EXPLORER IN CHARGE OF FOREIGN SEED AND PLANT INTRODUCTION

THE nurseries of this country are quite as independent of foreign plant material as are the other industries which American ingenuity and industry have built up, but, like all the other great industries, that of the production of small plants has not confined its activities to the growing of American plants or the handling of home-grown material.

I have ridden through nurseries in the West where the rows of nursery stock were a mile long and where there were thousands of these rows of small plants waiting to be sent out all over this country and into Canada.

The customs returns for the year 1915 give an import of plants in a living condition, as distinct from food materials of a plant nature, amounting to \$3,731,000. Of this amount about one million represents what might be called hard wooded plants such as evergreen and deciduous trees and shrubs which are set out with the idea of their becoming permanent residents of our parks, our orchards or our roadsides. The remainder represents the large importations of so-called florists' stock—such things as lily of the valley clumps for florists, hyacinths, tulip bulbs, bleeding hearts, lily bulbs, narcis-



GOVERNMENT BULB CULTURE

Portion of nursery planting of narcissi at the United States Department of Agriculture Bulb Garden, Bellingham, Washington. Madame Plomp in the foreground, Sir Watkin in the background. This picture demonstrates the possibility of bulb culture becoming an American industry.

This one firm alone plants a million and a half peach pits and half a million apple seedlings each year, and lists from 1800 to 2000 different varieties of plants for sale in its catalogue. Sixteen horses harnessed in teams together were pulling the machine which undercuts the small apple trees preparatory to lifting them for packing and shipping. Twenty-five miles of tile drains had been laid under the ground to carry off the superfluous moisture.

The nurseries of this country cannot be said to be dependent upon foreign sources in the way in which this term is commonly understood, but that there are thousands of species of plants needed by our nurserymen for the development of the greatest possible number of superlative varieties of native plants cannot be doubted.

sus bulbs, begonias, gloxinias, orchids, palms, azalea plants for forcing, iris, cannas, dahlias and amaryllis—plants which as a rule are either grown under glass or for a season or two in our flower borders or on our lawns and which, with perhaps one or two exceptions, can be grown in this country.

If we consider the imports of hard-wood material, for example, we find that we import 8,776,000 young seedlings of the apple, pear, quince, and St. Julien plum valued at \$41,314. If we assume that a half of these grow and are budded or grafted and set out in the orchards of the country, they will represent in the course of time 4,388,000 fruit trees, and assuming that the average distance apart of these trees in the orchard would be 20 feet,

these would represent an orchard or orchard areas totaling over 40,000 acres in extent. An orchard a mile square is a large orchard even to-day, and this 40,000 acres would represent 62 such square-mile orchards which would have root systems developed in American soil from the tiny rootlets which were produced first in the soil of some foreign country, be it France or England or Japan.

The question then is open for discussion as to what advantages and as to whether there are any disadvantages in having such a proportion of our orchards which

We know that there are root diseases, and serious ones, and there is no question that they may be carried by seedlings, but whether these are of such a nature as to make it advisable to shut them out of the commerce of the country is a question for the experts to decide and not one to be settled by political action.

The nursery firms of the country can grow apple and pear and quince and plum seedlings, and many are now growing such stock, but they could not grow the quantities required to supply the demand in the first year after



CHINESE WILD PEACH PLANTING

Portion of a nursery planting of the Chinese wild peach, *Amygdalus davidiana*, at the United States Plant Introduction Field Station, Chico, California. This peach has proven very valuable as a stock for dry lands and regions too cold for the cultivated peach.

we set out every year upon a root system taken bodily from a foreign soil and perhaps carrying the diseases of that country with them. Certainly it must be admitted that this whole question of the proper stock for our orchard trees is one the importance of which can hardly be overestimated. The fact that the plants which were imported cost us only \$41,000 or a dollar an acre and is a small import item should not mislead us, for the potential value of these trees will run easily into the millions.

On the other hand, it would be eminently unfair to assume that because we do not know that these little apple seedlings from the old world or from Japan are as clean and free from disease as any which we can produce in America, they represent undesirable immigrants and should be excluded from the country. Or that the diseases which they have are ones which will prove as serious or even more so in this country than they have in their native land, or that they will infect our soils and through this infect our orchards with diseases which they would get in no other way.

It is probably true that the principal reason why these seedlings are imported is because they are cheap—cheaper than it would be possible to produce them in this country. The question is one for a thorough and exhaustive investigation and the facts discovered will point the way to an intelligent handling of the question of their importation.

the foreign supply is cut off, supposing it should be, because they would have difficulty in getting the seeds and in establishing them in seed beds, and it would take two years or more for them to adjust themselves to the changed conditions.

When we turn to the imports of fruit and ornamental trees, evergreen shrubs, vines and all trees and vines known as nursery stock of which we imported \$805,305 worth in 1915, the conditions are different. Millions of this class of plants are already being grown in this country by our more progressive nursery firms.

There can be no question that the nurserymen of this country, at least the best of them—and there are no keener plant students in agriculture than are these American nurserymen—question the advisability of the large importations of so-called ornamental evergreens and other dooryard shrubs which are made from Europe largely through the department stores where they are used for advertising purposes. The department stores make no pretence to a knowledge of the quality of this class of material. It is cheap and they can almost afford to give it away. But often the purchaser has never before bought a plant for his dooryard. He looks upon a plant as a plant and puts it in carefully—as carefully as he knows how to—and it dies and he is discouraged and when the legitimate nurseryman tries to sell him a real plant that

will grow and thrive in his dooryard his mind goes back to his unhappy experience and he shakes his head and turns away with the thought in his mind that he has an unlucky hand with plants. The department store has advertised its own name, but the nurseryman has lost a customer, and the dooryard of at least one house is still ugly with dirty bricks and an ugly ground line.

Now I am not in possession of the facts to accuse the department stores of doing this wittingly, neither do I have any figures to show that the percentage of failures from this imported material is greater than from home grown nursery stock. I do know of instances where totally unsuitable plants have been imported and sold cheaply through department stores and others and died, and the stores have shifted the responsibility upon the foreign importer. The question concerned here is not one of the dependence of our nurseries at all. They do not, as I understand it, court or countenance this trade in cheap plants from abroad.

But how large a part of this item of \$805,305 represents plant material of this kind, I am unable to state. The fact ought to be determined and the advisability of its exclusion considered, provided that it represents a danger to our forest or street or park or ornamental plants.

That the American nurserymen need foreign plants in their business is a fact which ought to be given due consideration. Thousands of plant breeders and horticulturists are working in the gardens and orchards and nurseries of other parts of the world and an increasing number of new and valuable plants are being brought into existence, so to speak, and many of these are of dis-

tinct value to the people of this country, and the nurserymen of America represent the machinery through which these new plants can reach the commercial orchards and gardens of the country.

The inroads of diseases which we already have among our trees and other plants may make it imperative at any time to import some other species or variety to take its place. The spread of the chestnut bark disease and the search in China for a resistant form has led to the importation of millions of seeds of the downy chestnut of Eastern China, a resistant form unfortunately of small size but producing excellent chestnuts. The devastation produced by the pear blight which has swept the orchards of the Pacific Coast and causes millions of dollars' loss each year has centered attention recently upon a sturdy wild pear immigrant from the hills around Jehol north of Peking, which Reimer of Oregon has discovered is practically immune to this disease and at this present moment Mr. Meyer, our explorer, is buying up as many seeds as he can get of this disease-resistant species in order to test it in commercial orchards throughout this country.

Of course, it is conceivable that the Phylloxera might have been kept out of Europe indefinitely, but when it did get in, what are we to say about the rôle which the French and American nurserymen played in the rehabilitation of their vine-growing areas? And what would the vine growers have said to a policy which had restricted all the imports of the Phylloxera-resistant American stocks to the few hundreds or thousands which might be brought in through the slow and deliberate process of Government importation? It is true that in importing



MILLIONS OF YOUNG TREES GROWING IN A NURSERY

This view in one of the D. Hill Nurseries, Dundee, Illinois, gives one but a faint impression of the extensive nurseries of this firm, which are now growing millions of young, home-grown trees for planting out in this country. White Cedar, *Thuja occidentalis*, to the left; Norway Spruce, *Picea excelsa*, to the right.



the American vines, France imported the black rot of the grape and had to learn how to combat it, but the vineyards of France, so far as I know, are as flourishing as they were a generation ago. The wave of prohibition sentiment and legislation has made more difference to the vineyardists of this country already and makes more in France than all the grape diseases which have yet been discovered.

The shifting character of our plant industries is a matter which should not be lost sight of, I believe, in the consideration of any policy of national independence of our nurseries. This is true of both our annual and perennial crops, the areas of which are changing constantly. Look at the shift made by the flax area. Flax growing for oil has been pushed clear up into the extreme Northwest, even over into Canada. Consider the abandoned rice fields of the Carolinas and the immense new rice areas in California and Texas. Think of the great pear orchards of Georgia of twenty years ago which have been abandoned and are rapidly going to decay, or the great pear orchard areas in California which are now planted to barley. Consider the ghastly spectacle which Europe now presents where thousands of square miles of forest have been destroyed and strips of land miles in width and hundreds of miles in length have been so torn up by the shell fire that it is unfit for crop cultivation. Think of the readjustments that are going to take place in the agriculture of Europe where whole populations have been either wiped out of existence or find themselves reduced to abject poverty. I walked out under the forest trees on my place in Maryland and considered the changes which have taken place in the policies of the world since they were little seedlings.

The owner of my property was in those days ready to lay down his life in defence of the principle of slavery. The destruction of the forests was the advocated policy of the time. The discovery of paper pulp had not been made. The match and kerosene and gasoline and all the great chemical discoveries were still unmade when those trees were little seedlings. And when I look ahead and try to imagine what will be the situation in this country with regard to the plants which constitute our forests and our agriculture by the time the seedlings under my feet are grown up, I cannot feel the same degree of confidence which some people seem to have, that we can

decide now a policy which will protect these little seedlings for the next hundred years, in the face of the gigantic changes in transportation and commerce which those years will produce.

We can say to ourselves, "let us be independent of foreign plant production. Let us protect our own by

building a wall of quarantine regulations and keep out all the diseases which our agricultural crops are heir to and have this great advantage over the rest of the world." But the whole trend of the world is toward greater intercourse, more frequent exchange of commodities, less isolation, and a greater mixture of the plants and plant products over the face of the globe.

It seems to me that it will require the keenest research talent, the vastest amount of knowledge, the greatest ingenuity, unthought of amounts of money, and the wisest possible legislation to prevent the spread of the diseases of our economic plants and I cannot help feeling that each disease will require individual consideration and special legislation perhaps, and that in the end

there will be some sad failures and that mankind will not be able to preserve from destruction all the species of plants which he loves, even though he does devote to the task more intelligent labor than he has given to the preservation of the great food animals of the world which are so rapidly disappearing from its surface.

How far the restriction of plant immigration will lead to the building up of our horticulture and forestry it is difficult to say. The restriction of the breeder and the nurseryman in the species which he would have at his disposal would tend to limit his activity and his interest and slow down the process of the production of new forms. I believe there is no stimulus to the breeding and selection of plants which is greater than that produced by the placing in one's hands of other and different forms from those which one is accustomed to have about, and it seems to be an undoubted fact that the creation of new hybrid forms depends largely upon the possession of many species of a genus which can be crossed and recrossed until the desirable characters of all are gathered into one or more superlative hybrids which possess the great commercial value which is sought after. Any policy which slows down the active work of the country in this most important regard should be scrutinized with the greatest care and, if necessary, modified so as to allow of its development.



DISEASE-RESISTANT CHESTNUTS

A block of the Chinese Chestnut, *Castanea mollissima*, which inoculation experiments have shown to be quite resistant to the chestnut bark disease. The seed from which these young plants were grown was collected in China by Frank N. Meyer, Agricultural Explorer, and the plants were sent to experimenters in the area where the native chestnut was killed by the chestnut bark disease. It forms too small a tree to take the place of our American chestnut, but it produces excellent sweet nuts.

# THE DOGWOOD

BY DR. R. W. SHUFELDT, C. M. Z. S.

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IF there be one growth which more than any other impresses us with the charms of the early days of May in the country, the Flowering Dogwood is most assuredly the one. More than this: the same magnificent tree or shrub is equally decorative for a long time in the autumn. At the latter season, however, it is the leaves and not the flowers that are the parts so brilliantly in evidence. They are simply gorgeous in their coloring, and their blaze of scarlets, crimsons, reds, and golden yellows may be perceived through the woodlands and forests fully as far as one can see. The bunches of waxy berries, a rich vermilion in color, take part in all this, adding their share to the general rich color scheme.

This Flowering Dogwood is the species that generally comes up in one's mind in speaking of dogwood; but as a matter of fact, it is but a single representative of quite a numerous group or family, which botanists have designated as the Dogwood family, or *Cornaceæ*. Some of these may be herbaceous growths, but only rarely is such the case; as a rule, they are either trees or shrubs. In structure they are all interesting. In one genus of them the flowers are found to be perfect, and the leaves generally alternate. In a second group of dogwoods the flowers are unisexual—the two kinds being found on separate, individual shrubs. In this genus, too, the leaves are alternate, and the flow-

ers greenish. It has received the name of *Nyssa*, and to it have been relegated the Tupelos, the Pepperidges, and the Sour Gums. These are all trees, and the word *Nyssa* is derived from "Nymph," as the original species is a tree that grows in the water. All the species are trees, indeed *Nyssa aquatica* is a large tree. There is also the Black Gum (*N. sylvatica*), and its variety *biflora*, which is also a tree flourishing in the marshes of some of the Southern States. These three are all the species in the genus *Nyssa*; and the already mentioned Black Gum, with its dense, close-grained wood, finds some use in particular trades where such a wood is in demand.

Strange to say, the Dogwood family is related upon the one hand to the Parsley family, and upon the other to the Heath family (*Ericaceæ*); this brings us to a consideration of its typical genus or group, the genus *Cornus*, containing the Cornels or true Dogwoods. The wood of all these dogwoods is verily as hard as horn; and, as the Latin name for a horn is *cornu*, we have the generic name *Cornus*. Apart from the characters of the more minute structures, there are three very prominent ones: the bitterness of the bark, which possesses certain tonic properties; the tough, hard wood, and the entire, opposite leaves (except in one species).

Next to the Flowering Dogwood, in the matter of being a favorite plant, is, perhaps,



AN EXCEPTIONALLY HANDSOME DOGWOOD TREE

FIG. 1.—This magnificent specimen of Dogwood in full blossom presents the correct form of its growth when not impinged upon by surrounding trees. It will be observed that, when in full flower, its leaves are but little more than started.

the Dwarf Cornel or Bunchberry, which not only has a range from Maine southward to New Jersey, and westward to California, but is known to occur in the White Mountains and Adirondacks at elevations ranging up to 4000 feet. Its center of abundance is in the rich, damp woods of New Jersey, where it is well known; and, as its beautiful, red berries are very conspicuous in the fall, it is likely that people there gather and eat them, as it is a well-known fact that they are quite edible. Smallest of all the cornels, it blooms in June, in the center of its range; its tiny and greenish flowers are centered in a bunch as in the Flowering Dogwood, and they are, as in the latter, surrounded by a pointed, four- to six-leaved involucre resembling true petals. Gray says that the leaves and involucre may be, indeed often are, variously colored; and Mathews remarks that "the leaves are light yellow-green, broadly ovate, pointed, toothless, and deeply marked by about 5—7 nearly parallel, curving ribs; they are set in circles." After one knows this attractive plant, it will never be forgotten, so striking are its characters. Neltje Blanchan says that the tight clusters of round berries are lifted upward on a gradually lengthened peduncle after they fade, and in some of the popular botanies they are figured in that way; in fact, one author has even figured the flowers and involucre upon such an elevated stem, describing it so in the text. This is an interesting point to settle with respect to the

bunchberry. Gray says not a word about the flowers and their involucre being borne on a stem *above* the whorl of leaves.

Around Quebec and in Newfoundland, and as far northward as Alaska and Greenland, there is another species of dogwood (*C. suecia*), which is very much like the bunchberry but slenderer; it flourishes upon the headlands and cliffs, and it is probable that but few botanists have seen it growing in nature.

Reference has already been made to the Common Cornel or Dogwood. It

is the *Cornus florida* of the books, and it is found in dry woods from southern Maine and Minnesota northward to Ontario and southward to Texas and Florida. It may occasionally become quite a substantial tree, as will be appreciated by a study of Fig. 1 illustrating this article. If the involucre is regarded here as the four petals of a flower, more than two thousand flowers can be counted on this tree; but, as a matter of fact, each involucre surrounds many flowers (see Fig. 3), therefore there are in reality many thousands of flowers upon such a growth. Some dogwood trees are fully forty feet in height.

Not a few of the winter birds in the North Atlantic and New England States feed upon the brilliantly red berries of this dogwood; and the hard seeds being indigestible, they are certain to be dropped far and wide in other forests and woods, the species thus being distributed in new



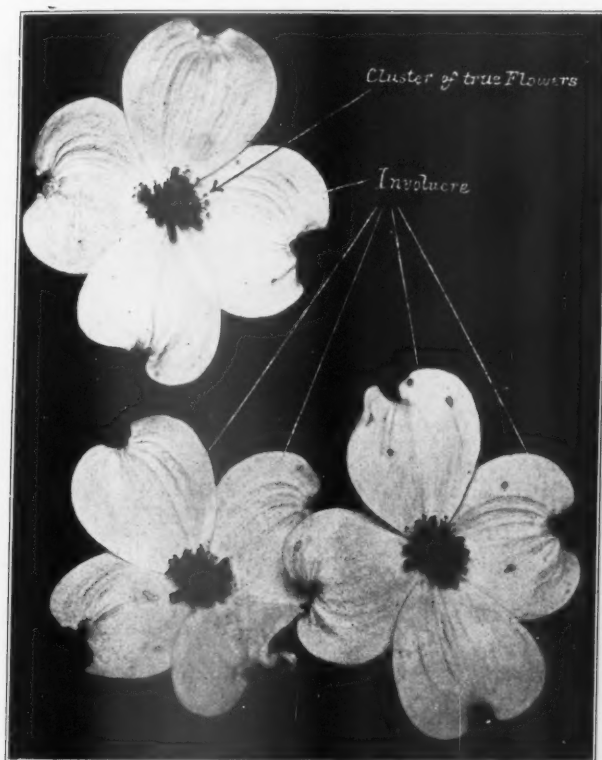
BEAUTIFUL DOGWOOD FLOWERS IN EARLY SPRING

FIG. 2.—This picture presents an example of Dogwood (*Cornus florida*) in full blossom; it was collected at Thrifton, Virginia. They are here represented about one-sixth natural proportions; the leaves are few, but of some size, as it was obtained during the middle of May (1915).



localities, often at long distances from where the parent tree grew. Many times flocks of hungry cedar birds have been seen in the winter hurriedly flying into one of these dogwood trees, laden with its scarlet berries, there to bolt these down. As is known the berries, while attractive to the eye, contain but little nutriment beneath their skins.

Thousands of ruthless hands break off the branches of the Flowering Dogwood during the months of May and



FLOWERING DOGWOOD BLOSSOMS SHOWING TRUE FLOWERS BUNCHED IN CENTER

FIG. 3.—Three full flowers of the Common Dogwood (*Cornus florida*), the two larger ones being quite perfect. The several true, small flowers are bunched together in the center, in open, naked cymes. The four surrounding, petal-like white leaves form a false corolla, and is known as an involucre. A true corolla formed of petals is seen in such a flower as the common buttercup, where they are yellow. Note the curious notches in the middle of the outer border of these pseudo petals—an ever-present character in these blossoms.

June, and this easily accounts, not only for its steady disappearance at this time, but for the poor, mutilated examples of this splendid shrub so often seen by the roadsides, or at short distances from them in the woods.

Thoreau says that when the farmers in some parts of New England hear the notes of the brown thrasher in April about corn-planting time, they translate them to mean "drop it, drop it—cover it up, cover it up—pull it up, pull it up"; but they will not heed this advice until satisfied of its soundness through observing that the Flowering Dogwood is in full bloom.

Many insects are responsible for the fertilization of the dogwood flowers, especially certain butterflies, bees and flies—a fact any one may observe by simply selecting some dogwood tree in the spring, when it is in full flower, and watching the numerous insects that visit it.

The wood of the flowering dogwood is very smooth, close-grained, and hard, and owing to these qualities, it

has been extensively used for making toothpicks. It has been called prick-wood or skewer-wood, as it has long been used to make butchers' skewers in some parts of the country. An authority at hand says that this wood "is so exceptionally free from silex that watchmakers use small splinters of it for cleaning out the pivot-holes of watches, and opticians for removing dust from small, deep-seated lenses." Medical works state that the bark as well as the root of this species is used in the United States as a substitute for Peruvian bark in cases of fever. There is scarcely any grit in its wood, and it is therefore useful for making bobbins and shuttles for weaving; for still other uses the cabinet maker will use no other wood. Other species of Cornels do not come in here, for the reason that they are mere plants, never even attaining the size of a small shrub.

There are two kinds of dogwood in which the fruit is blue, associated with other distinguishing characters; these are the Round-leaved Cornel or Dogwood, and the Silky Cornel or Kinnikinic, the first being the *Cornus circinata* of science, and the other the *Cornus amomum*. We may find the round-leaved species from Nova Scotia to



BUMBLE BEES DELIGHT IN VISITING DOGWOOD FLOWERS

FIG. 4.—Two flowers of the Common Dogwood (*Cornus florida*), seen upon side view. This picture shows a number of the young leaves about a week after they have started to grow. They are thick, pale green, and lanceolate in outline. This specimen was obtained very early one cold spring morning, and the bumble-bee in the upper flower was so chilled that he never so much as moved during the operation of photographing it.

Virginia and Iowa, westward to North Dakota. It is a shrub that may grow to be some nine or ten feet high, occurring chiefly in open forests and on hillsides where the sun rarely penetrates. It favors rocky localities, and may sometimes be found growing along roadsides. Its twigs are greenish, and curious waxy growths may be discovered upon them. Examine the leaves, and they will be found to be woolly upon their under sides. In shape

they taper to a point, though the general form is roundish, hence the name of the species. Blossoming in May and June, or in July farther north, they are easily recognized by their small, flat flowers, which are white, and may measure as much as two inches in diameter; they are arranged in clusters, and no involucre is present. Petals are gen-



FRUIT AND LEAVES OF FLOWERING DOGWOOD IN THE AUTUMN  
FIG. 5.—Extremities of dogwood twigs in the autumn. Note the curled form of the large orange and scarlet leaves. At the end of the twigs the berries or fruit are of a splendid vermilion color, and look as though they were made of red sealing wax. Each is of an ellipsoidal form, and the eight to ten in each cluster are bunched together at their bases. In the upper bunch note the single little round white buds, which represent the early stage of the flowers of the succeeding spring.

erally four in number, and branches are sometimes streaked with white. From the bark of this round-leaved dogwood is extracted "cornine," which has many of the medicinal properties of quinine, and is sometimes prescribed by physicians in the country where a strong tonic is indicated. Its light blue berries are not edible, and this shrub will grow in any kind of soil imaginable, whether it be of the richest, or of a quality so poor that it would not support any other kind of plant life, as Dr. Asa Gray goes so far as to say actually "on rock."

Another dogwood which has light blue fruit in the autumn is the Silky Cornel or Kinnikinic—a shrub that may sometimes grow to be nearly nine feet in height, while the branches, instead of being whitish as in the last species, are purplish. It gets its name of "Silky" from its silky, downy leaves, which are so upon their under sides, and which are of a rusty color. Formerly it bore the scientific name of *C. sericea*, but it is now the *C. amomum*. In form, the leaves are pointed, and are subject to vary somewhat. This has led one botanist to describe the supposed variety as a new species (*C. purpusi*, Koehne). As a rule, the Silky Cornel grows in wet localities from Newfoundland westward to North Dakota, and southward to all the Gulf States as far as Louisiana. Some people call it the Swamp Dogwood; and in the old days some of the American Indians smoked its powdered bark, believing that it acted as a tonic.

Some of the Cornels have white or pale, lead-colored fruit, generally pure white, as is the case with *C. asperifolia* and *C. baileyi*, the form being rather a tall shrub, and may occur from Lake Erie to Minnesota and far southward; it flowers in May and June. In another group is found still other species, as *C. alternifolia*, *C. paniculata*, and also the Stiff Cornel or Dogwood (*C. stricta*).

For the present purpose it will be necessary to describe but one more, and it, too, belongs in the same assemblage as the last three species. It is the Red-Osier Dogwood (*C. stolonifera*). It may easily be recognized by its lead-colored but oftener pure white fruit. Its branches resemble osier shoots; those of the year are of a brilliant reddish purple and quite smooth, and to this Gray adds that its ovate leaves are roundish at their bases, abruptly short-pointed, roughish, with a minute close pubescence on both sides, whitish underneath. It is partial to wet soils or soft, moist soils. By the aid of its running shoots, it is now found from Newfoundland to Mackenzie, south to the District of Columbia, then across the United States to the Pacific Coast region. It bears small, flat-topped flower clusters as late as July, and still later, August, to the northward.

Thus it is seen that the Dogwood family is far more extensive than is generally supposed. Economically, their wood is of considerable use, even in the arts, while their wide distribution, their decorative and attractive appearance, and early blossoming, all invite one to be extremely considerate of their conservation, and to encourage their more extensive cultivation in large gardens, on the border lines of estates and similar properties.

THE United States Forest Products Laboratory [at Madison, is trying by many experiments to find ways to cut the price of paper, and thus give material aid to publishers. The increasing cost of pulpwood has focalized attention upon the possibility of utilizing sawmill waste for the manufacture of chips suitable for pulp. An exhaustive study has been completed showing the extent to which mill waste is now used in making pulp as well as methods of barking, chipping, screening, drying, and baling chips.

# THE WARBLERS

(Family Mniotiltidae)

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**P**ERHAPS no family of birds plays a greater part in the protection of our forests than the warblers.

Being primarily woodland birds, they arrive in the spring when the leaves are just beginning to unfold and the hordes of caterpillars emerging from the eggs in which they have passed the winter. Not a twig goes unnoticed, scarcely a bud unscrutinized, as this army of busy travelers sweeps on to its northern breeding ground. During April, May, and June, when the migration is in progress, they practically rid the trees of insect pests which otherwise would defoliate them in a single season.

But besides this economic appeal they have an æsthetic one, and certain it is that no group of birds is more attractive to the beginner in the study of ornithology than these multi-colored, active, forest-dwellers. At first they baffle him with their great variety of colors and rather nondescript songs, but they lure him ever to more persistent effort by challenging his acuteness, his perseverance, his woodcraft.



A WATER SPRITE

A Louisiana water-thrush with larvæ of the black fly for its young. Rocky streams and dashing cascades make a home for this graceful warbler.

The Mniotiltidae is one of the larger families of birds, containing about one-hundred and fifty-five species confined entirely to the new world. In summer they are found from northern Alaska to Argentina but only about fifty-five species visit the United States. Forty species are confined to South America, thirty to Central America and Mexico, twenty to the West Indies, and ten to the Galapagos Islands. Thus it will be seen that, although the warblers are undoubtedly of tropical origin, they now reach their highest development in North America. Of

the North American species, it seems that quite a number have come into the United States from the West Indies, while others have originated in Mexico. The former, which include principally the genus *Dendroica*, notably the black-throated blue, the black-throated green, the magnolia, the chestnut-sided, and the bay-breasted warblers, are, as yet, confined mostly to eastern United States.



THE DOMED NEST OF THE OVEN BIRD

The oven birds and water-thrushes belong to the warbler family in spite of their common names. They are terrestrial birds, the oven bird spending its life among the leaves of the forest floor. Its ordinary song resembles the words—"teacher—teacher—teacher—teacher," but it has also a remarkable flight song.

Those of Mexican origin have spread over both the east and the west so that, today, there are about twice as many species in eastern United States as in the west.

Each species is characteristic of some particular faunal area as well as some particular habitat. Thus, after they have settled down for the summer, we find that certain species never nest north of Virginia, others never south of New York or Pennsylvania, and still others always north of the boundary of the United States. Among the warblers that go far north to breed might be mentioned the blackpoll, the Tennessee, the palm, the myrtle, the bay-breasted, the Blackburnian, the orange-crowned, and the Cape May warblers, and a little farther south, the magnolia, the black-throated blue, the black-throated green, the Nashville, the mourning, the Canadian warblers, and the water-thrush. The common breeding warblers of the northern United States are the yellow warbler, the redstart, the oven-bird, the yellow-throat, the black and



white, the chestnut-sided, and the pine warbler, and of southern United States, the Louisiana water-thrush, the Kentucky, the yellow-throated, the prothonotary, the



DOWN WITH THE CANKER WORM

A female mourning warbler feeding its young one of these leaf-destroying caterpillars. The warblers are the tree doctors and keep the trees in good health by defending the foliage against the ravages of caterpillars, aphids, etc.

blue-winged, the cerulean, the hooded, the worm-eating warblers, and the yellow-breasted chat.

Each species is characteristic also of some particular habitat; the oven-bird and water-thrushes are terrestrial, the Kentucky, blue-winged, and chestnut-sided warblers, and chats are birds of the undergrowth, while the black-

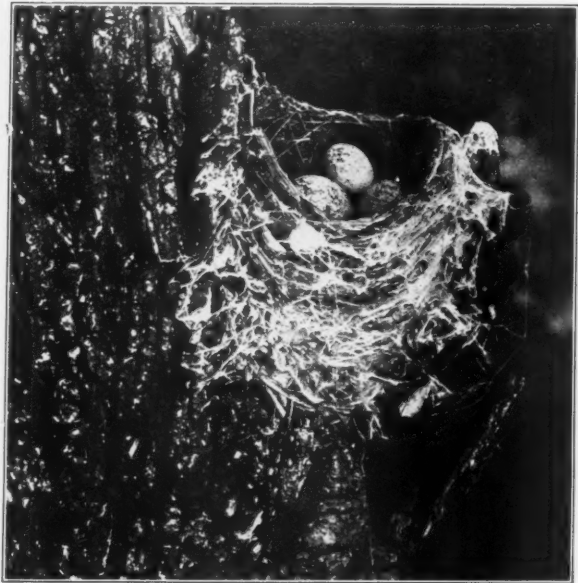


THE LARGEST OF THE WARBLERS

The yellow-breasted chat is a bird of bizarre habits whose timidity makes a close acquaintance impossible and photography extremely difficult.

burnian and yellow-throated warblers confine themselves largely to the tree-tops.

Since all the warblers are insectivorous, they are, perforce, highly migratory, seeking southern climates when the insect supply is exhausted in the North. Some of our species go only to southern United States for the winter, and the myrtle warbler, which is rather an exceptional species, and perhaps the hardiest of all, winters often as far north as southern New York, changing its diet to one of bayberries. Sometimes it even takes suet from a feeding station, together with the chickadees and nut-hatches. The pine warbler, which nests throughout the eastern United States, merely withdraws in winter to the southern third of its breeding range, from North Carolina southward. Thus it probably has the shortest migration of any of the species. The palm and orange-crowned warblers and a few black and white, yellow-throated, worm-eating, parula, black-throated blue, prairie warblers, northern



IMPOSED UPON

A nest of a redstart containing an egg of the parasitic cowbird as well as two of its own. The cowbird imposes upon many of the warblers but some of them have learned to build another floor over the unwelcome egg and thus prevent it from hatching.

water-thrushes, and oven-birds remain in Florida for the winter, but the majority of species and individuals continue farther south. The actual distance traveled varies a great deal. The prairie, black-throated blue, Swainson's, Bachman's, Cape May, and Kirtland's spend the winter in the West Indies; the worm-eating, magnolia, chestnut-sided, black-throated green, hooded, blue-winged, Nashville, orange-crowned, parula, palm, and Wilson's warblers, and the chat fly across the Gulf of Mexico to Central America, while the black and white, prothonotary, golden-winged, Tennessee, yellow, cerulean, bay-breasted, blackpoll, blackburnian, Kentucky, Connecticut, mourning, and Canadian warblers, the redstart, oven-bird, and both the water-thrushes continue into South America—some even to Brazil. The shortest journey which any blackpoll makes is thirty-five hundred miles, while those that nest in Alaska probably travel seven thousand miles

yearly to their winter home in Brazil. Nearly all the warblers of western United States spend the winter in Mexico and northern Central America.

It might be expected that those species which migrate to South America would follow the chain of West India Islands, keeping thus always within sight of land, but such is the case with only a few species, the majority preferring the direct flight of five hundred miles across the Gulf of Mexico. They migrate mostly at night, although they continue their northward journey slowly during the day, feeding as they go. Occasionally they make long flights across bodies of water by day, but usually this is done at night. What guides them on these journeys may always be a mystery, but it is now thought, and there is good evidence for so believing, that birds have a special and very highly developed "sense of direction." Ordinarily they migrate from a few hundred feet to nearly two



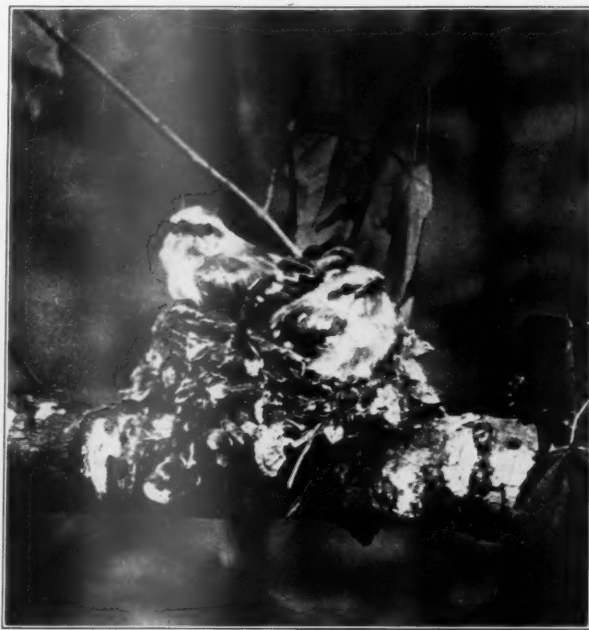
A COZY HOME IN THE MARSHES

A female yellow-throat on its nest among the sedges. One of these yellow-throats holds the record of having eaten 3500 plant-lice in forty minutes.

miles above the earth but, on cloudy nights, they descend to escape the clouds and then often become confused by the illuminations in light-houses or tall buildings and dash themselves to death against the glass. Several hundred birds, a large percentage of them warblers, have been picked up at the foot of a single light-house, the Washington Monument, and similar places, after a foggy night.

As might be expected, the first warblers to push northward in the spring are those which are the hardiest and whose migration routes are the shortest. Thus the pine and the myrtle warblers arrive in northern United States while the trees are still bare, and the blackpolls do not begin to arrive until the middle of May. In the fall the redstarts and yellow warblers start back before August while insect food is still most abundant, but the myrtles and others of short migration routes remain until the leaves have fallen.

One might assume from the name of the family that these little birds are beautiful singers. The truth is, however, that there are very few whose songs are much more musical than the calls of insects. Others whose songs are weak make up in sweetness what they lack in volume. The water-thrushes with their wild, ringing notes, the chat with its loud, bizarre calls and whistles, the oven



THE WORLD BEFORE THEM

Young cerulean warblers ready to leave the nest. The lichen-covered nest is one of the more unusual types found in the family and is extremely inconspicuous and difficult to find.

bird with its varied flight song, are, perhaps, exceptions. The simple trill of the yellow warbler, the wheezy notes of the black-throated blue, the insistent calls of the Tennessee and the blackpoll, the vivacious notes of the redstart and the chestnut-sided warblers fix themselves readily in our minds like the chirp of the cricket and the belated love calls of the katydid. They are expressive of the first green of gardens and hedgerows and the dark shade of northern forests, and when once learned they make the discovery and identification of the warblers a simple task, but no satisfactory method of transcribing them to paper has yet been found.

The nesting habits of warblers are as varied as their colors and present many surprises. Most birds nest where they find their food, so that one expects terrestrial birds to nest on the ground and tree-loving birds to nest in the tree-tops. One is not surprised, therefore, to find the nests of the oven-bird and water-thrush on the ground, those of the chestnut-sided warbler and the chat in the low bushes, and the blackburnian warbler's in the tops of the evergreens. It is strange, however, that the black and white warbler, which spends its life creeping about the trunk and larger branches of trees, descends to the ground to nest as do also the Nashville and Tennessee warblers which we find most frequently singing in the tree-tops. The roofed-over nest, which gives the oven bird its name, the lichen-covered nest of the cerulean warbler, and the

cottony cradle of the yellow warbler, are, perhaps, the most unusual of the warblers' nests, the others being fashioned of grasses, rootlets, leaves, and other common materials into the ordinary cup-like form. The eggs of the warblers are remarkably uniform, being creamy-white, more or less spotted with brown, and it requires ten or eleven days for them to hatch. The young remain in the nest from eight to twelve days but are cared for by their parents for some time thereafter, since only one brood usually is raised in a season.

To the warblers is given the care of the foliage of the trees and therefore the good health of the forest. They are the tree doctors just as the woodpeckers are the tree surgeons. As long as the foliage is kept in good condition the trees will be healthy and produce good wood. Conifers will scarcely stand a single defoliation and deciduous trees are seriously devitalized even by a single stripping of the leaves. Never a year passes when sufficient caterpillars are not hatched to defoliate every woodland in this country, so prolific are the moths which lay

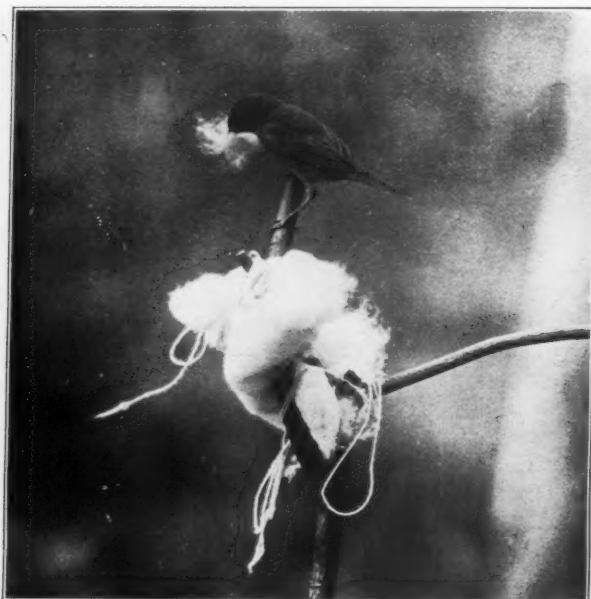


A CONFIDING CHESTNUT-SIDED WARBLER FEEDING ITS YOUNG  
Many of the warblers are apparently without fear of man and do not hesitate to feed their young even when held in the hand.

the eggs. It is possible and practical, nowadays, to spray the shade trees of city streets and thus protect them from these pests, although it is always an expensive process, but it will never be practical to spray entire woodlands. We must continue to rely upon the protection which birds give. Chief among these arboreal guardians are the warblers, and the thoroughness with which they do their work can be proved by any one who will observe a tree infested with the canker worms, aphids, gypsy moths, or almost any other pest of the foliage. Once the migratory troops of warblers discover it, they will remain about it for days, new birds frequenting it all through the migrating season, until the caterpillars become so

scarce that they are difficult to find. The number consumed by a single bird seems almost incredible, but much careful and accurate information has been accumulated by E. H. Forbush, the State Ornithologist of Massachusetts, giving actual numbers consumed, which attest the tremendous economic importance of this family.

Mr. R. H. Coleman counted the number of insects



"WOOL GATHERING"

The yellow warbler and the redstart can be encouraged to nest in the garden by supplying them with nesting material. Here a yellow warbler is taking some cotton that has been put out for it.



A CANADIAN LUNCHEON

A Canadian warbler bringing a crane fly to its young. The Canadian warbler is one of the common warblers of the north woods.



caught by a palm warbler and found that it varied from forty to sixty per minute. The bird observed spent at least four hours at the task, and in that time must have gathered almost ninety-five hundred insects.

Mr. F. H. Mosher observed a pair of yellow-throats feeding upon the aphids on a gray birch. One of the birds took eighty-nine of these tiny insects in a minute and 3500 in forty minutes. A chestnut-sided warbler was observed to take twenty-two small gypsy moth caterpillars in fourteen minutes, another, twenty-eight brown-tail caterpillars in twelve minutes, and a Nashville warbler ate forty-two caterpillars in thirty minutes, together with some other insects not identified. Many other observations could be listed, but the foregoing will give some idea of the good work the warblers are ever doing. While it is

true that the warblers and most birds do not like the large, full-grown, hairy caterpillars, they destroy them while small in great numbers, and such disagreeable species as tent caterpillars and tussock moths are relished, even in the adult stage, by cuckoos and orioles. If we should list all of the insects that have been taken from the stomachs of warblers, in the economic studies of the biological survey, they would run nearly the entire gamut of insect life.

Fortunate it is that the country is at last awake to the value of birds, that Federal laws for their protection have been enacted, and that we are learning to appreciate them not only from the economic standpoint, but also for the beauty and pleasure which they bring into life.

## MINING "CLAIMS" IN THE GRAND CANYON

BY H. H. CHAPMAN

A GREAT victory for public ownership has recently been won by court and departmental decisions, which will have a far-reaching effect in protecting public rights in all of our National Forests and Parks, and especially in the Grand Canyon. This is, in effect, that fraudulent mining "claims" or locations can no longer be occupied and held in defiance of authority and for purposes other than those contemplated by the mining laws.

There are many mining claims in the Grand Canyon, locations made years ago, ostensibly for mineral, but in reality covering portions of the canyon rim and trails in such a way as to give the claimants control of land to which the public should have access, hence carrying with them the chance to levy tribute on the tourist.

Mining claims can be filed on any public land, including National Forests, but not upon lands withdrawn as National Monuments, or National Parks. A claimant does not own the land until he "proves up" and gets a "patent," but the claim, if valid, does give him the right of exclusive possession, which is a property right, enabling

him to interfere with or prevent the public access and use of his claim. The statute reads, "no location of a mining claim shall be made until the discovery of the vein or lode within the limits of the claim located." Locations made where no mineral exists are fraudulent.

Before the creation of National Forests there was no incentive on the part of the Land Office to investigate the validity of mere mining locations. The claimant could maintain his rights for an indefinite period by doing a specified amount of work annually—termed "assessment" work—until he chose to bring the claim up for patent. The Land Office then examined the claim and if mineral was present in paying quantities, title or patent was issued.

But as soon as the National Forests were placed under proper administration, the officials in charge found that their management of the Forests was being greatly handicapped by the filing of numerous "lode" or "placer" mining claims covering the choicest bodies of Government timber, preventing timber sales and threatening the integ-



ON THE RIM OF THE GRAND CANYON

In the middle foreground is the Hotel El Tovar. Near it is the home and business place of the Kolb Brothers, and along the rim are numerous sites of mining claims.

city of the forest policy. They appealed to the Land Office, upon which rests the responsibility for passing upon the validity of claims to title, requesting immediate examination of those claims to determine whether or not there was mineral present. Perhaps certain advertisements appearing in California papers offering mining claims for sale and guaranteeing that they would "assay 12 sugar pines per acre" hastened this action.

Urged by this necessity, the Department looked up the precedents and decided that it was entirely within the authority of the Secretary to investigate the character of a mining claim at any time, without waiting for the claimant to seek a patent. It is generally known that but few claims filed are ever patented, and that in thousands of cases the claimants' rights are kept alive for many years by complying annually with the assessment requirements; hence in the absence of such authority, the Government would be powerless to interfere with a mining claim regardless of whether it is valid or fraudulent. This new policy was clearly set forth in a Department decision in the case of *H. H. Yard, et al*, 1909, in which the right to examine such claims at any time was announced.

A few of the most troublesome mining claims in the Grand Canyon were the property of one R. H. Cameron. The Canyon lay within and was a part of a National Forest. In order to protect this area from encroachments under the mining and other land laws, the Canyon was withdrawn in 1908 as a National Monument, and the Department held a hearing on several of the Cameron claims to determine their validity. The evidence showed that no mineral had ever been discovered on these claims; and under the precedent established by the Yard case, they would have been cancelled.

But at this juncture, the entire policy of the Interior Department was overturned by a new decision touching this very question. Two mining claims located by J. B. Nichols and Cy Smith on the Wallowa National Forest in Oregon were challenged by the Forest Service as fraudulent and intended for uses not contemplated by the

mining laws. The Land Office examined and cancelled the claims. But when this case was appealed, the decision which was rendered declared that the Department had no authority whatever to interfere with a claimant until he chose in good time to bring up his own case for patent, and that questions of the validity of such claims must be settled in the courts. This revolutionary decision was rendered in 1913.

The owner of the Cameron claims in the Grand Canyon was quick to seize the advantage thus offered and throw the case into the District Court of the District of Columbia at Washington, which court, acting upon the decision of the Interior Department, upheld the claimant.

Owing to the gravity of the issue involved, the Secretary permitted the case to go to appeal in order that the courts might be permitted to pass upon the policy of his subordinates, and settle the question. The courts soon spoke and in no uncertain terms.

In September, 1915, Judge Sawtelle of the District Court of Arizona refused to Cameron an injunction against the Department of Interior, and denied that the courts had any jurisdiction in such cases.

In December, 1916, the Court of Appeals of the District of Columbia upheld this view in case 2971, *Franklin K. Lane, Secretary of Interior, vs. Ralph H. Cameron*, and placed the responsibility of protecting the public against fraud squarely on the shoulders of the Depart-



THE DEVIL'S CORKSCREW

In this picture are shown the holes dug in prospect work by some of the men who established mining claims. If their claims were declared legal and the land became theirs they could charge tolls to the tourist who descended into the Canyon.



FINISHED ROAD OVER A MINING CLAIM

In the immediate foreground the road is part of one of the mining claims on the rim of the Grand Canyon.

ment, reaffirming the principles announced by this Department in the Yard case in 1909, which had been overturned by the Cy Smith decision in 1913.

As soon as this court decision was rendered, the Interior Department issued an order restoring the rights and responsibilities of the Department as declared in 1909.

It is significant that this latest decision cites numerous convincing precedents, including a clear-cut opinion rendered by the Supreme Court of the United States (Knight vs. U. S. Land Association, 142 U. S. 161) in which Justice Lamar says: "The Secretary (of the Interior) is the guardian of the people of the United States over the public lands. The obligations of his oath of office oblige him to see that the law is carried out, and that none of the public domain is wasted or is disposed of to a party not entitled to it."

... The mode in which supervision shall be exercised in the absence of statutory direction may be prescribed by such rules and regulations as the Secretary may



THE LINE OF A MINING CLAIM

On this road around the Grand Canyon the portion finished by the Government, and the unfinished section on the only mining claim where the road is uncompleted, are plainly discernible.

tions in the Grand Canyon or elsewhere. The control of the Grand Canyon is now secure forever to the people of the United States.

**T**HE report covering the spring and fall forest fire seasons of 1916, issued by the Pennsylvania Department of Forestry, shows that while almost as many forest fires burned in Pennsylvania in 1916 as in 1915, the area burned over was less than half that of 1915, and the timber loss was only a trifle over one-fourth as large.

**T**HAT mine timbers of white spruce, Sitka spruce, white birch, and western hemlock grown on the Chugach National Forest, Alaska, are fully as good as Douglas fir from the Rocky Mountain region and are superior to other Rocky Mountain species for use as mine timbers has been demonstrated by the Forest Products Laboratory at Madison, Wisconsin.

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## FOOD-PRODUCING TREES

BY J. RUSSELL SMITH, PH.D.

PROFESSOR OF INDUSTRY, UNIVERSITY OF PENNSYLVANIA

**H**ERE is a hybrid idea in search of a father. I seek not its creative father, but rather adoptive fathers who may take the hybrid idea and give it such fathering and fostering as it may merit. The idea itself is a hybrid between horticulture and forestry. It might be called fruitful forestry, if the foresters would not take offence. It is nothing worse than the production of food and wood on the same tree.

We have now reached the state in our industrial development when we need large areas of land put to trees that will produce many crops of useful fruit, nuts, beans, or other annual or occasional product before the final crop of wood. It is merely the intensification of tree culture that shall parallel the intensification of animal husbandry. In Australia, in the early days, cattle were reared for their hides and tallow, all else being thrown away. Then came the export of

meat, and lastly the daily crop of milk and its derivatives for several years before the final crop of meat. The wood of a tree is no poorer for the fact that it has supported fifty or a hundred crops of nuts, fruit, or beans.

I hope I may not cause any one to miss the main point by rousing questions of definition as to whether I am talking about horticulture or about forestry. My greatest delight would be for both foresters and horticulturists to adopt the idea and act on it. I have the notion that the forester has been missing great opportunities and has been limiting the field of his usefulness when he thinks of trees merely as producers of wood. Similarly, I think the horticulturist has been grossly neglecting opportunities when he has limited his energies to the production of crops for men to eat. Both forester and horticulturist have been too bashful. The great need of American agriculture to-day is not primarily things for men to eat, but things for the beasts to eat. Our domestic animals eat many times as much as we do, and trees, whether attended to by horticulturist or forester, can undoubtedly be made to yield vast amounts of forage if care

and attention are directed to that object. I suppose most foresters are aware of the fact that half or two-thirds of the entire weight of pork grown in Portugal is produced by the acorns of the cork oak and evergreen or ilex oak. There are many other trees that might join the oaks and make a series of crops that would supply a surprising proportion of the needs of domestic animals, especially swine and sheep.

With this idea of tree crop forage in mind, and with

the added fact that with the rising price of meat we are steadily increasing our consumption of nuts and are importing them by the millions of dollars a year, it becomes evident that foresters have been giving us, particularly farmers, bad advice in merely advising us to raise wood. There is little doubt that this idea of fruit harvests as well as wood harvests should have its proper place of beginning on the farmers' woodlot.



A GIANT GRAFTED OAK

This tremendous oak stands in a garden in Majorca. It produces a crop of acorns which provide food for a number of pigs.

Over and over again I have heard the foresters' advice to the farmer to "plant his steep hillsides in trees." The hillsides need the trees but the advice as given is often bad for two reasons: (1), the process is so slow that the farmer is not reached by appeal; (2), the yield is so small that the farmer can't afford to put part of his small acreage into this low and slow form of production. Instead of being told to plant trees and wait until they die to get something, he should be told to plant trees that will yield annually, or certainly every other year, and then finally a crop of wood. With this advice, the chances of getting him to plant his hillside into trees are greatly enhanced, because he can begin to profit in three, five or ten years instead of waiting twenty-five or fifty or seventy-five.

### CROP TREE AREAS AND WOOD TREE AREAS

I am not advocating that all forests should be of harvest-yielding trees. We need the utilization of land in the many ways which combine to the best service of the nation. Some lands should be in wood-producing forests only. These lands, however, should be those which have from man's standpoint some climatic handicap. Unfor-

tunately there are plenty of such lands. Lands with first-class climate are too valuable to grow mere wood. Some part of our country to the South, as indicated by climatic studies,<sup>1</sup> as well as by history and present development, seems not to have a first-class climate for the development of numerous, vigorous, energetic and healthy men. Here timber should be grown. Certain parts of America are too cold and have winters too long for the easy support of large numbers of people. Here also timber should be grown up to the limit of trees. But in that large middle



NOTE THE COMPARISON

On this ground, twenty miles north of Seville, Spain, is seen on one side of the fence a fire-desolated goat pasture, on the other grain fields interspersed with oak trees producing forage for fattening hogs.

territory of which the United States has so much, and Canada has some, where it is neither too hot nor too cold, where the malaria does not prevail, and the climate stimulates man to activity, and climate permits production, there land should be made to feed him in the largest numbers. There trees should not loaf their lives away. Under the present system of land utilization most of Appalachia with its splendid climate has no economic future except in forests. Present tillage for it means destruction through the gulley. Yet we have the very stimulating example of Corsica where similar mountain slopes as steep as a house roof and even steeper are clothed for miles in a continuous expanse of trees which look strangely like a forest, yet every tree is a grafted chestnut. Every acre is as valuable as good corn land in Indiana, and scattered along the magnificent macadam roads are the substantial stone villages of the numerous population that supports itself in comfortable prosperity from the combined income of chestnuts, chestnut wood, and the by-product of pasture and a small garden patch. The chestnut industry has continued in Corsica for centuries. Certainly the earth offers few examples of agriculture so permanent, so automatic, and so easy. When a Corsican gets pushed for money he goes out and cuts down an old giant worth often from \$10 to \$25 in American gold.

<sup>1</sup> See Ellsworth Huntington, *Climate and Civilization*.

There are many crop trees that may rival or equal the chestnut. Such utilization of our hills and mountain slopes would increase rather than decrease the tree area of much of the hilly part of our country and at the same time give the needed soil conservation, the needed water conservation, the needed scenic effects, and the spiritual comfort of the great trees.

#### MAKING OVER THE WILD TREES

It should not be forgotten that the thing I am advocating is quicker than forestry. The man, even the young man, who plants an oak tree has little reason to expect to live to utilize the timber from its trunk. Yet it is a fact that most of our oaks have specimens which will bear fruit in from three to seven years when grafted upon the suckers growing up around the stumps of their own or allied species. Thus, instead of having the forest fire follow the lumberman, he should be followed by the tree grafter, converting mediocre oaks into prolific oaks, mediocre hickories into good shag-barks, wild persimmons into fruitful persimmons, average black-walnuts into those few



BEARS 1200 LITERS OF ACORNS YEARLY

The food value of the annual crop of this evergreen oak tree near Algarve, Portugal, with its spread of fifty feet, is indicated by its record production of acorns.

excellent ones that will furnish kernels in whole quarters, ever-bearing mulberries in place of the prolific but quick-ripening wild variety. All the above kinds of grafting are from present knowledge known to be feasible.<sup>2</sup> I have taught ignorant mountaineers how to do the whole lot except the oak, and that is a common practice in English parks and gardens.

This process of establishing crop trees need not be limited to the conversion of wild trees. Many of the fruit-yielding trees are easy to transplant, and some of them yield quickly, especially the mulberries, which fruit wild at the height of a man's head, while specimens of the selected "ever-bearing" varieties will actually bear in the nursery row. The mulberry is so highly prized by the pig,

<sup>2</sup> See reports of Northern Nut Growers' Association, W. C. Deming, Secretary, Georgetown, Connecticut.

so easy to transplant, so prolific, that it is probably the easiest point of approach to the farmer who wishes to experiment along these lines.

The practice of the Corsican mountaineers in their tree crop agriculture or fruitful forestry, whichever you choose to call it, is very suggestive of a proper method of handling the technical question of getting a stand of trees and keeping it, and at the same time utilizing the by-product of pasture. The Corsican goat, whose milk makes much good cheese, browses in the chestnut forests and keeps down most of the undergrowth. When a Corsican sees a chestnut tree which in five, ten, or twenty years is likely to be ready to go to the pulp mill, he goes off to his little nursery, digs out a ten-foot chestnut, and plants it near the one which it is to succeed. He puts two stakes beside it to keep it from being ridden down by the goats. When it is established in two or three years, he grafts it, and there it stands leading a submerged kind of life for five or twenty or thirty years. But when the old monarch by which it stands finally comes down, it is ready to spring promptly into rapid growth and the fullest possible utili-



PRODUCTION OF MULBERRY TREES

This grove on a Carolina farm is producing posts, firewood, and an estimated crop of twenty-five dollars' worth of pork each year. The Everbearing variety feeds the pigs for two months.

zation of the vacated light, space and fertility. It is true that the natural way to propagate a chestnut is to graft the suckers that grow up around the stumps, but the Corsican finds it is quicker to have the understudy tree established in advance. This method also saves the necessity of protecting the suckers from the merciless teeth of the ingenious and industrious goat.

#### FRUIT AND LIGHT

Perhaps some forester, if he has read this far, has raised the objection that to produce timber, trees must be tall, to be tall they must crowd, and crowding cuts off light and limits fruit. I at once grant all this. To make the tree yield the best amount of fruit, it must have light on all the ends of its branches, a fact which the Corsican knows well and practices carefully.

But just here I wish to call attention to the fact that the primacy of the saw log is passing; we are ever finding more uses for our wood in the form of pulp, and I will be glad to hear from any forester who can give me actual figures on the relative yield of total wood per acre on a crowded stand of tall timber and the open stand of well-lighted trees capable of yielding fruit. This comparison, if it is really to test out my point, should be made of fruit-yielding trees growing in conjunction with some form of



WILD OLIVE TREES IN ALGIERS

The land not only furnishes sustenance to these revenue-producing trees but also excellent grazing for the numerous sheep seen browsing there.

leguminous nurse plant, either leguminous bushes or leguminous pasture plants.

#### LEGUMES TO FEED THE OTHER TREES

Here is a simple device which has been little used, but which has great possibilities. It is well known that the legume, gathering nitrogen in the tubercles on its roots, can share it in that same season with a non-leguminous plant growing alongside. This has been shown by experiments that reveal much higher protein content in non-leguminous plants growing in a mixed stand with legumes than in the same species growing without legumes. There are many legumes which, granted lime and phosphorous, will riot in the half-shade and interspaces of trees that are so spaced as to produce fruit. One at least of these legumes, the ordinary yellow locust tree (*Robinia pseud-acacia*), is one of the surest land improvers I know. In 1904 I planted an apple orchard in an abandoned field that had in it some locust thickets. In four years' time the trees that stood near the stumps of the leguminous locusts were two or three times as big as the others, and in thirteen years they have not lost their lead. Similarly I find that the persimmon, that goat among trees, capable of surviving on such starved land as the cotton farmer abandons, also waxes near the locust tree.

I submit that the locust is a very admirable nurse plant for such non-leguminous fruit trees as the chestnut, walnut, hickory, pecan, persimmon, mulberry. It need not be allowed to grow up and shade them. The tree will



live and make roots and survive an annual cutting even in August. In fact, I have been nearly driven to despair by seeing the way they have survived where I have attempted to kill them by ten consecutive August cuttings. But there is an easier way of keeping them down and yet keeping them alive. Turn in every winter or every other winter a bunch of goats. They will gladly peel the bark from every locust bush, permitting it to start again which it will cheerfully do *ad infinitum*, thus keeping the ground full of nitrogen and humus, furnishing nitrogen for some nearby big fruit tree and furnishing winter forage for goats. The fact that these trees are much beset in some localities by borers will rarely cause their complete extermination, but merely make them less of a menace to the tree they are intended to feed and not to shade.

Fortunately we do not have to depend on more self-perpetuating and continuously murdered trees, or even the clovers, to get this leguminous nitrogen supply. The honey locust tree is one of the most promising of fruit-yielding trees for the reason that it possesses two excellent qualities: (1) it is a timber tree of high order; (2) its nitrogenous and also sugary beans are much prized by cattle, and have an analysis value which would give them, in the ground form, a market value approaching that of corn, and

a nutritive value so high in protein as to make the meal a rival to wheat bran. It is a close duplicate to the carob bean meal of the Mediterranean and of American patent stock foods, and to the mesquite bean meal which is becoming so important in Hawaii. This honey locust, with its good timber and good beans, could therefore be interplanted with walnuts, hickories, persimmons, pecans,

mulberries, or other non-legumes all of which love the nitrogen, and thus the land could have two crops and at the same time be bringing forward timber trees of the highest quality.

The honey locust tree is a heavy yielder of beans. A specimen growing in my neighbor's yard yielded 350 pounds in 1912, and I have heard of higher records. The tree survives much aridity, grows on the plateaus of western Kansas, Western Colorado, and joins territory with the mesquite, whose nutritious beans have fed cattle, deer, antelope and Indians for centuries. Between the honey locust species and the mesquite genus we have a good forage bean tree that will grow over at least 2,000,000 square miles of the United States, an undeveloped resource of amazing possibility, and one that requires immediate experimentation by forest experiment stations and farm experiment stations.

For increase of fruit areas, there is a compromise method which may appeal to the forester because it gives a crop of wood and at the same time brings us to the possibility of quick, cheap, easy, and effective fruit production. I have in mind the habit of the tall slim forest-grown trees which when left in clearings throw branches down their erstwhile bare trunks and make of themselves tall cylinders of foliage, affording the maximum possible leaf surface ex-



PORTUGUESE CORK FOREST

The thrifty trees in the background yield a large revenue, while the harvesters in the foreground thrive upon the auxiliary crop of acorns.



IS THIS A FOREST?

This is a view on the Sorrento Peninsula, Italy. Every tree seen in the photograph is a food tree. In the foreground are walnuts and in the background olives.

posed to the sunlight, and at the same time a long log in the middle which will at least make second-class lumber, strong. This habit of feathering their long bare legs is part of the equipment of the chestnut, the walnut, the oak, and probably many other trees, and if the trees did not do it naturally themselves, it could doubtless be induced by a few well-placed strokes of the hatchet.

To use this device effectively, logged-over land that is to grow up again could be grafted to choice varieties which, with a little care, could be permitted to grow up tall and straight with the other timber. I have seen the Paragon and other grafted chestnuts do this. When merchantable pole size had been reached, all timber could be cut, but the grafted trees which, with their height of 30 to 60 feet, would at once start to bearing useful crops, and, with the development of the side branches down their trunks, reach a high maximum of productivity in a few years.

#### FRUIT IN THE ORTHODOX FOREST

It is not necessary for all of this article to be heterodox. There is one place where I can be orthodox, and urge the foresters to keep any definition of forestry they want and still have other crops than wood. Plant the cork oak tree. We undoubtedly have a large area with suitable climate, judging by the ability of this tree to survive and reach its best in poor and rocky lands in the Iberian Peninsula as well as to thrive in experimental plantings over a wide area in this country. The argument that springs to so many persons' minds, namely, the Old World with cheap labor, does not hold in connection with the

cork oak, in which the number of days' labor for stripping a ton is very small, and the value per ton high and increasing with our increased demands for it. I may say, from some examination of cork-producing areas in Spain, that there is very little increase in output promised in that country, and those responsible for American forests will do well to plant considerable areas of it.

In its home land cork forest makes a considerable part of its income by feeding swine with acorns. I want to call attention to the apparently easy possibility of having a cork oak tree as far up as we want to raise cork, and grafting an evergreen (ilex) oak at the top. This latter tree, with its greater acorn qualities will undoubtedly increase the yield through acorns, and there is no apparent theoretic reason why it should hurt the cork. The general practice of grafting oaks is not difficult, and I have been told by Spaniards of successful inter-grafting between these two species. The work would not be extensive if the Barcelona type of cork tree, namely, the straight

trunk, were favored, while the Portuguese shape with four or five branches would not require an unreasonable amount of grafting. An even simpler process for the getting of desired types of oaks on large areas would be the planting of oak forests, using seed that would come true to type of desired strains. I have been told by the plant breeders that it would be a comparatively simple matter to get

such strains of acorns, and the time involved would not be so long as first thought would suggest if one would follow some such device as this. Select the desired strains, hybridize them, sprout the hybrids, test them by grafting on mature trees so that in a comparatively short time the true yielding strains could be found, and then these could be grown in some isolated spot where no other oak trees nearby could cross fertilize. Such spots might be found in islands like the Catalina Islands, in isolated places in evergreen forests, or say out in the great plains. In fact the opportunity of establishing such botanic islands is very great.

#### PROGRAM

Apparently the steps in the development of this piece of work should be somewhat as follows:

1. Search for and test of new useful species, such as the honey locust, which is yet nowhere a crop.

Another example of this possibility is the osage orange, a magnificent timber tree producing heavily of big fruit from which undoubtedly we could extract a number of useful things if we handled them in carload lots. I have been told that they contain starch.

The list of trees valuable for both wood and fruit is doubtless large, especially if we consider the possibilities from the best tree of the species, and of breeding from a selection of such trees. That brings us to the second part of the program.

2. Search for good parent trees.

We know that the persimmon is a tree capable of thriving in a field that is so poor as to be "thrown away." All over the territory below Mason and Dixon's Line, and in some places above it, we know that it is a heavy yielder of fruit, that it is the most nutritious fruit grower east of the land of dates, that it is prized by pigs, sheep, horses, cows and humans, that it grafts easily, but we do not yet know where are the best parent trees. The recent



SUCKERS OF SCRUB OAK

These, locally known as "turkey oak," grew in thirty months on a very poor sandy soil over which a forest fire had swept. The soil was of Cambrian sandstone formation on the crest of the Blue Ridge Mountains near Bluemont, Virginia.

discovery of the finest pecan in America, growing in Indiana,<sup>3</sup> is again suggestive of the lack of botanic exploration in this country, especially economic botany. There are shag-barks that will come out of their shells in whole halves. The same is probably true of black walnuts. Where are the best of these parent trees? There are doubtless mazzard cherry trees with kernels in their seeds



A GRAFTED PERSIMMON TREE

This tree, burdened with fruit, is standing where it sprung up by chance in a Georgia cow-pea field. Peas and persimmons are both gathered by foraging pigs.

big enough and nutritious enough to make them a crop for pig feed, but no one as yet has taken the pains to search them out or make tests.

3. Finally comes plant breeding, and its possibilities when applied to the native and imported fruitful trees growing in America are quite beyond adequate contemplation. The well-known experiment of Dr. Van Fleet with the chestnut is, however, so suggestive as to merit a brief rehearsal. By using the useless, small, but very sweet chinquapin, and the large, prolific, Japanese chestnut, useless because of its poor quality, he has produced a hybrid good enough to eat, big enough to handle commercially, and with two added highly useful qualities: First, high immunity to the ravaging chestnut blight and such prolificacy that the seedling will sometimes bear eighteen months from the sprouting of the seed. That does not agree with our ideas of the slowness of nut trees, or the slowness of tree breeding. It should be remembered that trees are individuals, and that they vary in almost all respects, such as speed of growth, flavor of fruit, size of fruit, abundance of fruit, frequency of fruit-

<sup>3</sup>This is the Posey. It was awarded the prize at a Mobile meeting of the National Nut Growers' Association, an organization practically limited to southern pecan growers.

ing and resistance to pests. The tree world is to the botanist as clay in the hands of the potter and the botanist has scarce begun. I hope that the ensuing years may see a vast increase of constructive work looking to the fuller utilization of our tree resources as a factor in production and conservation.

#### EASTERN FOREST LANDS BOUGHT

**T**HE National Forest Reservation Commission has authorized the purchase by the Government of 32,266 acres of land in the Southern Appalachian and the White Mountains, for inclusion in the eastern National Forests. In accordance with the policy of the Commission, only tracts were approved which block in with the land already owned or acquired in the established "Purchase Areas."

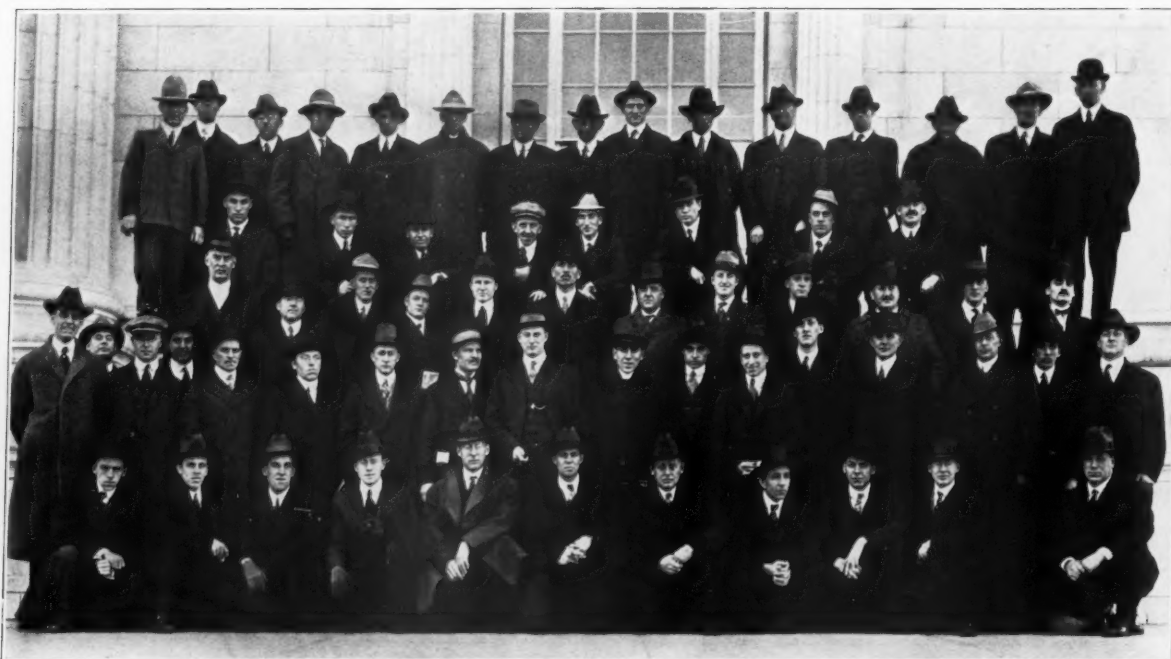
The largest and most important purchase is that of a number of tracts in Lawrence and Winston Counties, Alabama, which total 14,360 acres. The Alabama Purchase Area was authorized two years ago in order to protect the headwaters of the Sipsey River, an important tributary of the Black Warrior River, on which an expensive system of locks has been installed by the Government to facilitate navigation. Within the boundaries of the Purchase Area and adjoining the tracts just approved there are approximately 13,000 acres of rough mountain timberland to which the Government still retains title and which have been withdrawn from entry for inclusion in the National Forest.

A total of 11,116 acres in Oxford County, Maine, and Coos and Carroll Counties, New Hampshire, in the White Mountain National Forest, was also approved. Of this amount about 7,000 acres was comprised in a single tract on the Kilkenny Division. Other tracts whose acquisition was authorized include 998 acres in Caldwell, Henderson, Macon, McDowell, and Yancey Counties, North Carolina; 954 acres in Shenandoah and Amherst counties, Virginia; 600 acres in Oconee County, South Carolina; 738 acres in Randolph County, West Virginia; and 3,500 acres in Monroe County, Tennessee.

**N**EW uses for wood are being developed constantly, but the first wooden tennis court of which there is any record has been built at the country home of E. B. Hazen, who lives several miles from Portland, on the Columbia highway. The tennis court is built of inch pieces, three inches wide, set on edge, and sufficiently close together to make a solid floor, yet sufficiently spaced to give ventilation and allow the water to run off without gathering and promoting decay.

**T**HE day of the wooden golf club shaft is not passing. There is enough hickory in America to provide all the shafts for the golf clubs that American golf players can want for years to come. It has been asserted of late that the time was coming when, from scarcity of hickory, club shafts would have to be made of steel, but there is no foundation for such a statement.





UNITED STATES FOREST SUPERVISORS AT DENVER

The spirit of public service shown by such men in their work has brought about the active coöperation and marked confidence of the citizens with whom they come in contact, which is a distinct aid in the Government's policy of forest conservation. The names of the Forest officers in the photograph are: A. L. Sweitzer, James F. Conner, John W. Spencer, C. A. Neeper, Earl S. Peirce, Chas. Farr, Jay Higgins, Fred B. Agee, R. W. Allen, Ray Peck, James A. Blair, J. W. Langworthy, C. L. Cecil, Lee E. Cooper, Geo. A. Duthie, Grover C. Hougham, M. J. Sweeney, Lynn H. Douglas, Arthur T. Upson, Alva A. Simpson, Peter Keplinger, Steve Doering, John McLaren, H. H. French, O. R. Craft, A. G. Hamel, Earl B. Tanner, C. M. Granger, John W. Lowell, John H. Hatton, Wm. O. Sauder, Fred R. Johnson, James Blackhall, Leslie Brownell, T. V. Venemann, P. G. Redington, H. N. Wheeler, Arthur M. Cook, M. W. Thompson, Gordon Parker, W. J. Barker, Wm. R. Kreutzer, R. E. Clark, H. L. Borden, A. F. C. Hoffman, H. C. Hilton, Paul D. Kelleter, Dwight S. Jeffers, C. G. Poole, P. J. Paxton, Smith Riley, E. W. Tinker, Crosby A. Hoar, W. J. Pearce, F. H. Carroll, Fred W. Morrell, Theo. Shoemaker, J. B. Cammann, Ress Philips, G. E. Marshall, Chas. Gosorn, H. Earl French, Sanford Mills, W. I. Hutchinson.

## THE NEW SPIRIT OF PUBLIC SERVICE

BY C. J. STAHL

**I**N the early-history days of the National Forests in the West, the administration of the then so-called "Timberland Reserves" was carried on by a small force of officers whose duties consisted largely of fire protection, construction of improvements and timber sale reconnaissance and inspection, and who were obliged to refer practically all matters of importance to the Washington headquarters for decision. In time, this system of central control, which was found to result in delay and dissatisfaction to Forest users, was replaced by a scheme of local management in which the business of the National Forests was entirely handled by individual Supervisors under the direction of District Foresters with headquarters conveniently located as regards the geographical distribution of the Forests.

Today, as a result of this new system of management, a marked change has taken place in the West, both in the understanding of the Government's conservation policies and the feeling on the part of the public towards the National Forests and the men of the Forest Service. You find it everywhere—this spirit of "partnership," of lending a helping hand to the "other fellow," and it may be truly said that no body of Government officers in

the country are now more looked up to and respected than the men who carry the burdens of administration of our National Forests.

"What has brought about this change?" you may ask. The answer is—the new spirit of public service, which carries with it a downright personal interest in all matters of State, community and public welfare, and nowhere has this new spirit ever shown to better advantage than at the Forest Supervisors' convention held in Denver, Colorado, recently.

Organization, efficiency and progress were the keynotes of the meetings. Not "what is the Government going to do for us?" but "what can we do to make the National Forests better known and more useful to the public?" were questions oft repeated by the Supervisors. Many men who in past conventions were able only to discuss local Forest problems or minor points of official procedure, were here to be found on their feet speaking fluently and convincingly on subjects of general public interest. To one who has watched the steady growth of the Forest Service during the past fifteen years, this conference marked the beginning of a new era which promises much of achievement and success.

The convention lasted six days and was attended by over sixty Supervisors and officers of the National Forests of Colorado, Wyoming, South Dakota, Michigan, Minnesota, and Nebraska. Twenty-nine National Forests were represented, and a wide range of topics closely related to the upbuilding of the West discussed. District Forester Smith Riley presided at the meetings, and each day was given over to the consideration of some particular branch of National Forest work, such as good roads and their relation to State and community development; organization and up-to-date business methods; opportunities for public service and educational problems for Forest Service men, etc.

Lectures on organization and efficiency were delivered by the manager of the Ford Motor Company's plant in Denver, the superintendent of the Mountain States' Telegraph and Telephone Company and the efficiency engineer of the Denver Tramway Company. Good roads problems were presented by officers of the Bureau of Public Roads, United States Department of Agriculture, and the subject of game conservation dealt with by the director of the Colorado Museum of Natural History. Other interesting papers were delivered by members of the Colorado Mountain Club and officers of the Boy Scouts' organizations.

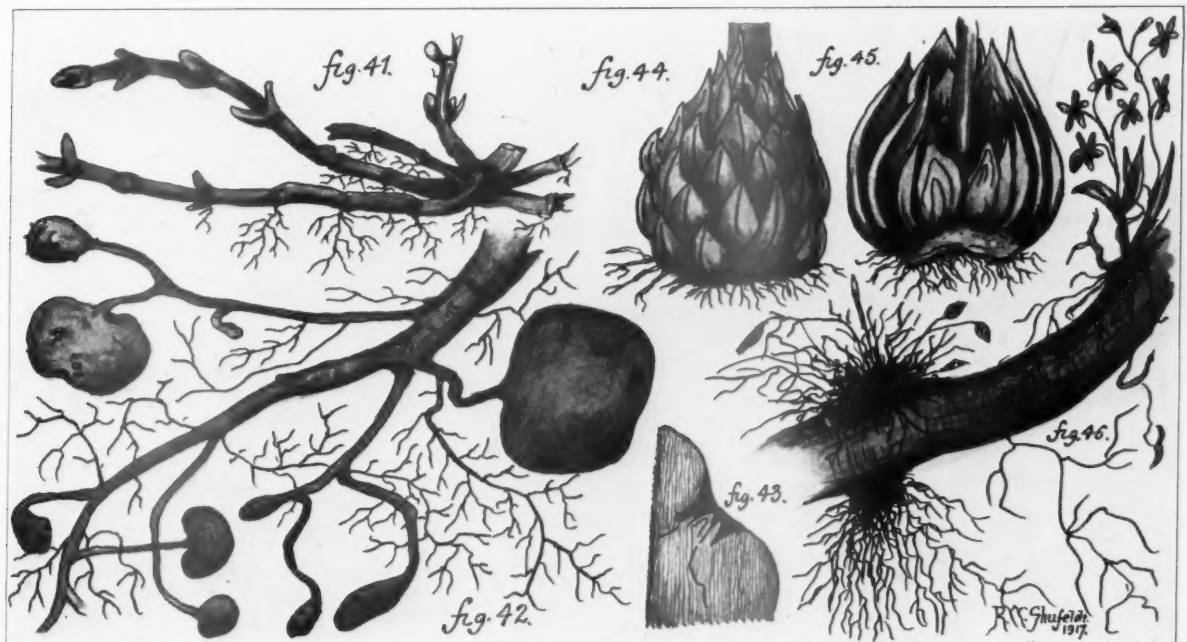
The possibilities for the development of the National Forests as great recreation centers; for the use of the poor man as well as the rich, was one of the paramount topics

of the convention. Figures were presented showing that the Forests of District 2 had over 667,000 visitors in 1916 and of that number the seventeen Forests of Colorado contributed over 600,000 visitors.

On one day of the convention the Supervisors made a special trip to Fort Collins as guests of the Colorado State Agriculture College. After inspecting the experiment station the men attended a series of lectures on various subjects connected with the grazing of livestock on the National Forests, delivered by members of the College faculty. The program concluded with a banquet in the evening.

During the convention in Denver the "get-together" spirit was fostered by a series of dinners at which prominent speakers addressed the Supervisors, and by social dances and theatre parties. At the close of the meetings resolutions were adopted commending and supporting the work and administration of H. S. Graves, Forester of the United States Department of Agriculture and Smith Riley, District Forester.

**T**HE shortage of labor in the lumber industry is being felt even in the government operations on the Menominee Indian reservation at Neopit, Wisconsin. The supervisor, A. S. Nicholson, is having difficulty in finding two hemlock inspectors and a yard superintendent.



ILLUSTRATED GLOSSARY—FURTHER DESCRIPTIONS OF ROOTS

Figure 41, the rootstock of the peppermint; this is nothing more than an underground creeping stem. Such *rhizomas*, as they are called by botanists, are more generally known as running, creeping or scaly roots. From their manner of growth and structure of their stems, it is clear that they are subterranean branches, having joints or nodes with axillary buds at their points of union, with other evidences of branch structure. Such underground stems are extremely difficult to get rid of, and are therefore of great annoyance to the agriculturist and farmer.

Figure 42 illustrates the nature of a *tuber*, and shows the subterranean growth of the common Irish Potato, which gives every stage of an ordinary tuber. The eyes of the potato are merely axillary buds, and one of these is shown on section in Figure 43.

*Corms*, or solid bulbs have already been briefly touched upon and illustrated.

Another form of the corm is seen in the bulb, though the two plans of growth merge into each other. When perfectly typical, however, they are such growths as we see in the Canada Lily (Figure 44), shown on section in Figure 45. The thickened scales there shown are bases of leaves which are loaded with nourishment for the plant. There are hundreds of examples of such growths to be studied, being duplicated many times in fleshy plants.

Parasitic plants like the mistletoe grow upon other plants, and their roots draw sustenance from them. This, however, is not the case with certain air-plants or Epiphytes, for these live entirely upon what they get from the air. Two species of them are shown in Figure 46, the one with the flowers being the *Epidendrum conopseum*, and the other the "Black Moss" (*Tillandsia usneoides*); both are from our Southern States, and are very instructive plants to study.

## SPRAYING WORK OF THIS SEASON

BY J. J. LEVISON, M.F.

FORESTER TO THE CITY OF NEW YORK

**T**HIS is the time when all nature awakens. The insects awaken also, and we have to meet their destructive invasion. Just what to spray and what material to use is a matter that varies with the plant and the insect, and before one can determine what is needed, an effort should be made to receive specific advice based on the



INJECTING CARBON BISULPHIDE FOR BORING INSECTS

The liquid is injected by means of a metallic syringe and the orifice clogged with soap to hold the fumes generated by the liquid within the burrow.

particular insect and the tree in question. Without considering individual questions, we can, however, to advantage discuss in a general way the important methods of spraying and how to combat some of our most serious enemies.

We spray for insects that either chew or swallow the leaves of trees or those that merely suck the sap from leaves or bark. A poison applied to the surface of the leaves will cause the chewing insects to swallow it with the leaves and become internally poisoned. Arsenate of lead serves that purpose and is most commonly used—at least more so than Paris-green, which is another poison occasionally substituted.

To combat the sucking insects, no such application of arsenate of lead to the surface of the leaves would ever reach the insects, because the latter penetrate through

the outer tissue of the leaf and suck the sap from the interior. To be effective against sucking insects, the chemical required must be of such a nature as to injure the insect by contact with its tender body. The various oil emulsions in the market, such as kerosene emulsion, lime sulphur wash, scalicide, miscible oil, fish-oil soap, and the nicotine and tobacco concoctions are all based on this principle. Which one of these to use and at what strength is a matter that varies with the season, the insect and the plant.

In dormant seasons one can use a stronger solution than in the summer time because then there is no likeli-



HAND-POWER SPRAYING APPARATUS

This is a very convenient way of applying the spray to trees. More powerful gasoline sprayers are required where very tall trees are to be sprayed.

hood of burning the leaves or the open buds. In the dormant state one may also have to meet an insect heavily protected with an outer scale or possibly in the egg stage, and consequently requiring a stronger solution. The particular species of tree would also make some difference because some trees are more tender to oil emulsions than others.

With these preliminary remarks to put us on the right track, let us make up a simple spraying calendar which will hold good for the majority of cases of spraying during



the present season, though it may not cover the numerous specific troubles which we may also have to meet.

*Spraying For Scale Insects.*—While the trees are in dormant state, before the buds open, it may be advisable to spray for some sucking insects on fruit trees, and possibly on elms, poplars, willows, ash and lilac.

Some sucking insects, like the oyster shell and the scurfy scales, have their young emerge in May and it is advisable to take advantage of the tender state of these young crawling insects and to spray the trees at that time with an oil emulsion which will be more effective than if applied during the dormant season.

If kerosene emulsion is applied, it may be used at the rate of 1 gallon to 10 gallons of water before the buds open, or 1 to 25 gallons of water, after the buds have opened.

In the case of scalicide, it should be used 1 to 15 gallons of water before the buds open and 1 to 40 after the buds open.

In the case of fish-oil soap, about 1 pound to 10 gallons of water.

*Spraying For Red Spider and Aphis.*—During the month of May, it may be necessary to spray some of the evergreens, such as boxwood, etc., for red spider, and in that case one should use fish-oil soap at the rate of 1 pound to 5 gallons of water. The underside of the leaves of beech trees and Norway maples may be often seen affected with soft-bodied insects and in those cases the same treatment as for red spider is effective.

*Spraying For Leaf Eating Insects.*—During the latter part of May the elm leaf beetle becomes active on the leaves of the elm trees and the caterpillars of the Tussock Moth and other similar insects begin their work. For all such leaf-eating insects, one should spray the trees with

arsenate of lead at the rate of one pound to about 12 gallons of water.

*Spraying For Mildew and Fungous Diseases.*—Such spraying may be necessary on fruit trees, etc., and the application should consist of Bordeaux mixture or Bordo-lead at the rate of 1 pound to 5 gallons of water before the buds open, or 1 pound to 10 gallons of water after the buds open. Never apply the Bordeaux spray while the trees are in blossom. Pyrox is another material often used effectively as a substitute for Bordeaux mixture.

*A Few Practical Hints For All Spraying Work.*—The following reminders during the spraying season may prove of value:

Examine your spraying apparatus and see that the nozzles are clear, that

the hose does not leak; that the machinery works well. Always try to spray with a fine mist. Spray thoroughly, covering the leaves on the top of the tree as well as on the lower branches. The Tussock Moth and most of our other leaf-eating insects feed on the under side of the leaves and, therefore, all spraying for such insects must be applied to the under side of the leaves.

Keep the mixture within the spraying tank thoroughly stirred. Do not spray on a wet day or at a time when you anticipate rain.

Be more careful with contact poisons because too strong a solution will burn the foliage and tender bark, while arsenate of lead will have no such effect.

In spraying for sucking insects try to hit as many of them as possible because it is the contact of the poison with the insect that kills.

With the foregoing instructions one can get an idea what general spraying he has to do this month, and if any specific questions arise at any time one should take them up individually and obtain definite advice.



COCOONS OF THE BAG-WORM

This is merely one illustration of the many forms of winter nests of leaf-eating insects. Note how numerous they are on a single twig.

#### ADVICE FOR MAY

1. Plant evergreens during the first part of May.
2. Spray for all varieties of insects, including those kinds that chew, suck and bore.
3. Spray for fungous diseases.
4. Commence cultivating and watering trees and shrubs.
5. Complete the removal of trees hopelessly infested

with boring insects, such as the Hickory Bark Beetle, the two-lined Chestnut Borer, etc.

6. Examine trees in early May and see that they are free from eggs of the Tussock Moth, Gypsy Moth, etc., and from cocoons such as those of the Brown-tail Moth, the Bag-worm, etc.

## QUESTIONS AND ANSWERS

Q. I am much interested in the question of the saving of the white pines, and in this connection I wish to take advantage of the offer, extended in your magazine, to answer helpfully any questions about trees. I own a good many acres of woodland on the shore of Sunapee Lake, and during the last few years have noticed at times a peculiar condition of some of the pines. About three years ago, and again in the spring of 1916, I noticed that some of the pines had tufts of brown needles at the extremity of the branches. At first only a few of the trees were so affected, but last year there were a good many more. In the one or two years between, I did not notice this condition. Is this the result of what you are now calling the white pine blister disease? I did not notice anything unusual on the trunks, and the main part of the tree did not seem to be injured. Nothing was noticeable except this dying of the tips. If it is not the disease in question will you tell me what it is, and whether it is harmful to the trees, and what should be done about it.

A. D., Wellesley, Massachusetts.

A. With relation to the condition of your pines, I do not believe that it is caused by the pine blister disease. Very likely it is simply due to a condition of drought which varies with the year and the season. There has been much of this during the past few years all over the East. There have also been of recent years several pests that worked principally in the terminal shoots of certain species of pine. We had the white pine weevil, destroying the leaders and tips of white pine trees, and the pine shoot moth, attacking Scotch and other pines. Just what your trouble is can best be told by submitting to us a sample of the affected branch and letting us examine it.

Q. We have a suburban home place and would like your advice about the best trees and shrubbery to plant. We have two catalpas, a hedge and some miscellaneous bushes and some fruit trees that are not doing much. I want to plant some hardy shrubbery and also some trees that will produce good fruit in our climate.

A. J. N., Kansas City, Missouri.

A. I am glad to send you the best advice and suggestions I can as to planting for the improvement of your place. The best varieties of apples for your use would be Red Astrachan, McIntosh, Baldwin or Rhode Island Greening. The best pears are Bartlett and Sheldon. The best peaches would be Champion and Elbert, and the best varieties of cherry, Early Richmond and Montmorency.

For shrubbery, I would suggest forsythia, weigela, California privet, *Aralia pentaphylla*, *Cornus siberica*, *Rosa rugosa*, Rose of Sharon, lilacs, hydrangea, Regel's privet, *Symphoricarpos racemosus* and *Symphoricarpos vulgaris*. In the January issue of AMERICAN FORESTRY you will find an article on hedge planting and cultivation.

Q. Can you tell me what is the matter with the tree of which I send you a specimen leaf, under separate cover?

E. H. K., Philadelphia, Pennsylvania.

A. The leaf of aspidistra received proves to be severely infested with the Florida red scale (*Chrysomphalus ficus* Ashm.). Remedies recommended for use against this insect are described in the enclosed circular.

Q. Will you please explain the difference in the Red Gum and the Sweet Gum?

R. J. M., Chelyan, West Virginia.

A. There is no difference between the Red Gum and the Sweet Gum. They are one and the same tree, also called *Liquid-*

*ambar*, meaning liquid gum, referring to the sweetish, fluid, gummy exudations. The Black, or Sour Gum, sometimes called Tupelo, is an entirely different tree. I enclose an article from the November issue of our monthly magazine, AMERICAN FORESTRY, covering fully the identification and characteristics and commercial uses of Red Gum. I think you will find this interesting and valuable.

Q. Will you please tell me what to do for a tulip tree that has some kind of a scale. They come on the branches and on the new wood. They are dark brown, shaped like an oyster. When you crush the shell, they are pink and like thick milk and honey. In the spring the young ones are white and look like a bed-bug and can crawl.

H. R. T., Sands Point, New York.

A. The scale is the tulip scale and very commonly infests tulip trees in your vicinity. The best way to eradicate the pest is to brush off the scale insects with a coarse hair brush and then wash the infested branches with a solution of soap and water or kerosene emulsion, one part to ten parts of water. Before brushing the scales off, it is advisable to spread some canvas or paper on the ground in order to collect the insects and burn them afterwards. This work should be done immediately and the trees watched again next summer for a second crop of the insects. Within about a year, the pest can be permanently eradicated.

Q. Is *Thuja plicata* the correct name of Western Red Cedar? And will you give me the common and technical names of the Southern pines?

R. C. F., Flushing, New York.

A. Yes, *Thuja plicata* is the correct technical name for Western Red Cedar. The correct common and technical names of the Southern pines are as follows: *Pinus palustris*, known as Long-leaf Pine, or Georgia pine; *Pinus echinata*, or Short-leaf Pine, Yellow pine; *Pinus Teda*, the classical Latin name for pitch pine, which was used for torches; *Pinus caribaea*, or slash or Cuban Pine.

Q. I wish to obtain your opinion relative to the practice, now so common, of scraping the outer bark from our shade trees for the purpose of removing scale and other insects, and furnishing no places for their concealment. Many of our most beautiful shade trees, generally elms, have been given this treatment and occasionally the trunk is afterwards painted with some insecticide. All this operation entails great expense to the tree owner. Personally I have been opposed to this treatment of trees, but I would appreciate a discussion from you on the subject.

W. W. M., Chicago, Illinois.

A. There is no justification for the practice of scraping the bark of shade trees. It does no good and sometimes does harm and many varieties of shade trees, such as Norway maples, Oriental planes, etc., very seldom have any scale insects on their trunks. If you spray the infested trees with oil solution at the proper time, especially when the young scale insects hatch and become active, you will generally catch most of the insects, no matter where they are—under the loose bark or on top of it. Scraping off the old bark exposes very suddenly the young, tender bark underneath to sun, heat and dust and smoke, and produces better bait for scale insects than the old bark because scale insects prefer to live on young, tender bark. We think that if you would allow nature to take care of the loose, superfluous bark and not scrape it off prematurely, the trees would be better off.

# AEOLIAN EROSION IN HAWAII

BY C. S. JUDD

SUPERINTENDENT OF FORESTRY

**A**N unusually good instance of æolian erosion is to be seen on the island of Kahoolawe in the Hawaiian group, which I have recently visited. It is a striking illustration of damage done by goats and sheep and wind.

This island, which is one of the smallest of the group, and only ten miles long, six miles wide, and 1425 feet above the sea at its highest point, was proclaimed a Territorial Forest Reserve in 1910 with the idea that it could be reclaimed from its present deplorable condition, which has resulted from over-grazing during the past fifty years. Kahoolawe was always a more or less barren island, for in the early days its inhospitable shores were used as a place of exile for criminals and historical records show that at no time were there more than eighty Hawaiians living there.

In 1864 the island was leased by the King for fifty years as a sheep ranch. Wild goats, descendants of those brought by Vancouver and other early navigators, were already on the island, and these with the sheep, which soon multiplied and overran the island by the thousands, upset the balance of nature on the upper reaches which were exposed to the full force of the constant trade winds. The consequence was that the remaining turf on about one-third of the island at the upper elevations was destroyed, and the loose soil exposed in this manner soon began to be carried out to sea by the wind. This

æolian erosion has been going on for at least forty years, and ship captains always know of their approach to Kahoolawe on windy days by the cloud of light red dust that pours off in the lee of the island. In a few protected places on the summit, islets of soil from six to ten feet high, crowned with turf, remain as mute testimony of pristine conditions, but the soil on the remainder of the summit of the

island has been blown away until nothing remains but bare hardpan, as bleak and as desolate as the bad lands of the Dakotas, and still scoured by the howling trade winds.

One of the accompanying illustrations shows how a native wili wili tree, *Erythrina monosperma*, has been undermined by wind erosion and left stranded, as it were, on this shore of desolation with only a few roots to carry on the functions of life. In the lee of the tree there still remains a mass of original protected soil which has been augmented by dust drift.

Although the reclamation of the summit of the island seems hopeless, unless stone-wall barriers to the wind are erected at great expense preliminary to tree planting, the remaining two-thirds of the island gives greater promise of early improvement. The first step in the plan of reclamation has been to get rid of the wild stock on the island, and during the last eight years over 4,000 goats have been exterminated. I have returned from the island with a party of fifteen members



WHAT THE WIND HAS DONE

Wili wili tree on Kahoolawe Island, Hawaii, undermined by the strong trade winds blowing the soil around it out to sea, after sheep and goats had cropped the turf so closely that the wind tore it off and exposed the underlying soil.



AN AERIAL BATTLEFIELD

On the summit of Kahoolawe Island, Hawaii, lie trunks of dead trees killed when the strong trade winds swept away the soil about their roots after the soil had been exposed by over-grazing by sheep and goats.



of the National Guard of Hawaii and two cowboys, and during the short stay of two days our bag was 286 goats and 2 sheep. The island has already begun to show improvement on account of the reduction of stock, by the increased growth of native grasses and weeds, and the algaroba, *Prosopis juliflora*, or mesquite of the Southwest, which has been spread by the few work horses which have been allowed to graze on the island, is coming up abundantly on at least 18,000 acres along the lower elevations and promises soon to become an extensive forest valuable for the production of wood for fuel, beans for stock feed, and blossoms for bee pasturage.

#### TOUR OF THE NATIONAL FORESTS AND PARKS

A COMBINATION of recreational and educational features is the plan for a tour of the National Forests and National Parks proposed by the Massachusetts Forestry Association for the coming summer. The Association proposes to give its members and others who were interested in conservation and the development of the National Forests and Parks an opportunity of seeing at first hand, under the most favorable circumstances, what has been done with these great areas and to learn what the plans for the future are concerning them.

The Association is deeply indebted to the officers of the United States Forest Service and those of the National Parks Service for their coöperation in the preparation of the plans for this tour. Through their advice and kindly assistance, those who are fortunate enough to make this tour will have at their service in many of the parks and forests the men who are most familiar with those areas and who are charged with the development of them.

On Thursday, June 28, the party will leave Boston, arriving in Denver the following Sunday morning, there to visit Rocky Mountain Park, Pike's Peak, and to inspect the reforestation work of the Forest Service in the Pike National Forest.

Six days will be spent in Yellowstone Park and six more in Glacier National Park. From the Glacier National Park the party will journey to Lake Chelan in the Chelan National Forest, there to be guided by a representative of the United States Forest Service.

The party will have two days for rest at Seattle and an afternoon sail through Puget Sound to Tacoma will be made on the way to Rainier National Park and Forest and then on to Portland. From there the party will take an all-day journey over the beautiful Columbia highway to the Eagle Creek Camp which is one of the best examples of the recreational facilities furnished by the National Forest Service. The next day another auto ride takes the party among the foothills of Mount Hood to the Forest Nursery of the Wind River Valley where over 5,000,000 young trees are growing. On this trip will be seen the scientific logging methods used on a timber sale area of the National Forest. Crater Lake National Park and Forest will be the next destination.

After the trip to Crater Lake three days will be spent in San Francisco in rest and sight-seeing. A conference on the various aspects of the conservation problem will be held with the representative interests of the Pacific Coast. From San Francisco the party goes to the Yosemite National Park where five days will be spent in the camps, and in seeing the beauties of this famous valley. Leaving the park, the party passes through the Sierra National Forest on the way to Fresno. The next point of interest will be the General Grant National Park where the Big Trees will be seen at their best. A visit to Hume, a lumber town in the heart of the Sequoia National Forest, will give a new idea of transportation of timber, by a fifty-four-mile flume winding down the mountain. Los Angeles for three days with short excursions to Pasadena and the island of Santa Catalina follows. An optional visit may be made to the Los Angeles Municipal Camp in the Angeles National Forest, where public recreational facilities have been highly developed. San Diego and its exposition will next be visited, followed by a motor trip to Redlands and San Bernardino where will begin the homeward journey, interrupted only by a two-days' stop at the Grand Canyon.

Arrangements are being made by boards of trade and similar organizations in the Coast cities to give the party a hearty welcome. A nominal guest fee will be charged to non-members of the Massachusetts Forestry Association, but this will not apply to applicants who are members of other forestry or conservation organizations. Further details of the tour can be obtained by writing to the Tour Director, Dr. C. L. Babcock, 31 Trinity Place, Boston, Massachusetts.

#### LAKE SUNAPEE

By Richard Butler Glaenzer

Oh, do you know that lovely lake not far from Croydon  
So like some girlish dreamer when asleep;  
When wide-awake, so like some hoyden?  
That lake which seems so shallow, yet is deep, so deep?

There are a thousand lakes more large, oh, far more spacious,  
Basined among great mountains capped with snow;  
But none with marge more brightly gracious,  
And largeness counts for little: here is glow and glow!

The glow, the gentle silver gleam of far more birches  
Then ever Indian wanted for canoe:  
A waking dream for one who searches  
For gleam of haunting silver—such as you and you!

THE Grand Rapids, Michigan, Y. M. C. A. is starting an innovation in the organization of an educational class for members of the many lumber and forest products factories of the city. Such problems as methods of cutting, sawing, piling and air-drying are to be considered.







## PINE BLISTER QUARANTINE HEARING

A PUBLIC hearing to consider the restriction or prohibition of shipments of pines and of currant and gooseberry bushes, to prevent the spread of white pine blister disease, was held by the United States Department of Agriculture on April 10, at Washington, D. C.

The question of whether a quarantine line should be drawn either at the western border of the States of North Dakota, South Dakota, Nebraska, Kansas, Oklahoma, and Texas, or at the Mississippi River, or at some intermediate point, was considered.

The white pine blister disease has continued to spread in New England and eastern New York and has been found to a limited extent in Minnesota and Wisconsin. Energetic measures for its eradication or control are being taken by Federal and State Governments and by the American Forestry Association in realization of the danger which threatens our immensely valuable pine forests. To assist in this control work and to prevent the blister disease from getting a foothold in the western United States, consideration was given to the desirability of prohibiting all shipments of white pine nursery stock from the Eastern and Central States to the Western States. Currant and gooseberry nursery stock must also be considered in this connection, since they are hosts for the blister disease, and are a necessary stage to its development.

A domestic quarantine to protect the pine forests of the West was proposed a year ago and a hearing held in February, 1916, by the Federal Horticultural Board. It was then found that the most effective results would be secured by prohibiting the shipment of Eastern pines and gooseberry and currant bushes west of a line drawn beyond

the Mississippi. Such a quarantine was not then legally possible nor was sufficient knowledge available of the distribution of the disease in the Central States; consequently, Federal action was limited to securing the voluntary coöperation of nurserymen to prevent shipments west of the Great Plains.

Congress at the last session amended the Plant Quarantine Act to permit the drawing of quarantine lines where needed to prevent the spread of plant pests rather than at the boundaries of infected States.

### WHAT VARIOUS STATES ARE DOING

That the introduction of the white pine blister disease into California may be prevented, and to coöperate with the Eastern States in its suppression, G. H. Hecke, State Commissioner of Horticulture, has issued a quarantine against the introduction into California of all five-needled pine trees, and all species and varieties of currant and gooseberry plants and cuttings imported or brought from any and all States of the United States east of the Mississippi River. The disease has not yet been noticed in California, and it is believed that this quarantine will prevent its introduction.

Indiana and Kansas prohibit the importation into the State from outside sources of all species of currants and gooseberries and of all five-leaved pines.

New York, March 24, 1917, prohibited the importation into the State of any five-leaved pines from Maine, New Hampshire, Vermont, Massachusetts, Rhode Island, Connecticut, Pennsylvania, Illinois, New York, Ohio, Indiana, Minnesota, and Wisconsin.

### National Forest Enlarged

Acting under the authority of a special Act of Congress approved September 8, 1916, the President has, on recommendation of the Secretary of Agriculture, signed a proclamation adding approximately 50,000 acres to the Whitman National Forest, Oregon. The lands involved are situated on the divide between the John Day, Powder, and Burnt Rivers, in east-central Oregon.

Over 4,000 acres consist of timber lands which were included in patented entries. As the result of suits brought by the United States, the patents for these entries were cancelled by the courts because they were acquired through fraud or mistake, and the lands were returned to Government ownership. The cancelled claims carry a total estimated stand of nearly 46,000,000 feet B. M. of timber.

Much of the other land included in the addition is privately owned. It consists largely of out-over timberland, on which the timber growth is rapidly reproducing.

One portion of the Act of Congress authorizing the addition provides especially for the exchange of Government timber for privately owned lands in the Whitman National Forest which may be chiefly valuable for the production of timber or the protection of streamflow. Several applications for exchanges of this character have already been submitted.

### Saw Expert Addresses Forestry Students

Thomas Oakland, one of the saw experts representing the Simonds Saw Company of Fitchburg, Massachusetts, lectured to the forestry students at Wyman's School of the Woods, Munising, Michigan, March 7th, on the use and care of the cross-cut saw. He explained how saws were made, how to select them when buying, and how to keep them in good working order when in use. Mr. Oakland is an old woodsman and a past master with the cross-cut saw. His actually fitting and filing a saw before

the students made it especially practical and instructive.

### Forester Appointed

Trevor S. Goodyear, a student in the department of forestry of Washington State College, has received notice of his appointment as assistant state forester of Washington. He has accepted the position and expects to assume his duties about June 1. Mr. Goodyear graduated from the State College last June, but returned to take another year in forestry. During the vacation he was employed by the Washington Forest Fire Association with headquarters at Seattle, and there came under the observation of State Forester Pape, who was so favorably impressed with his qualifications that he recommended the appointment to the state board of forest commissioners, who confirmed the recommendation. Mr. Goodyear was a member of the varsity football squad for three years, and was president of the State College Forest Club last year. He is also commander of the Sigma Nu fraternity chapter.

# EDITORIAL

## THE SUMMER CAMPAIGN AGAINST THE WHITE PINE BLISTER

AS a direct result of the policy of education and information adopted by the American Forestry Association and others, Congress passed the additional appropriation of \$300,000 required for the work of suppressing the white pine blister disease. This action was taken at a time when bills calling for immense appropriations for national defense were under consideration, and the appropriation was secured in spite of assurances from Congressmen that it would be impossible to obtain it. The result is a vindication of the policy of publicity, without which, in a democratic form of government, we cannot hope to achieve anything worth while.

But the real task lies before us. Appropriations alone will not exterminate the disease—and it is by no means certain that the effort will succeed, no matter how conscientiously the work is handled. One thing has been pitilessly demonstrated—that the policy of suppressing information and belittling the danger has not gotten us anywhere. By this act of Congress we now stand com-

mitted to a thorough and widespread effort to stamp out the infection. This season will probably show whether or not it is too late. All that the agents of the United States Government can do in expending this appropriation is to scout for and reveal the presence of diseased pines or currants. It is up to the states and to individuals to destroy the infected trees and plants, and if this coöperation is not forthcoming, all efforts elsewhere will fail.

The work of preventing the spread of the disease will be greatly aided by the enlarged powers granted to the Federal Horticultural Board to declare quarantines in tree and plant diseases by districts, states or sections of the country under which they may prevent absolutely the shipment of currants or gooseberry bushes or white pines into the Rocky Mountain section. So far, no cases of infection have been reported west of Minnesota. Such a quarantine may save the immensely valuable western white pine and the sugar pine of California from ultimate destruction.

## NATIONAL PARK LEGISLATION

THE bill to create the Grand Canyon National Park failed of passage in the last Congress for lack of time. This bill, as drawn, excludes from the proposed park lands chiefly valuable for commercial grazing and timber, and not part of the Canyon itself. It should be reintroduced and passed at the first opportunity. But we protest against permitting the development of water-power within the Park, and will continue to strive for the principle of exclusion from National Park areas of all forms of commercial exploitation—a danger which is not properly safeguarded in the recent law establishing a National Park Service.

Of the numerous bills introduced in this Congress to create new National Parks, only one was passed, which establishes the Mount McKinley National Park in Alaska. In this matter, Congress has acted with commendable discretion. The merits of the Mount McKinley Park project were unquestioned. As America's highest peak, possessing scenery of unsurpassed grandeur, the setting aside of this mountain as one of our National Parks fully maintains the standard set by the Yosemite, the Yellowstone and the Sequoia. This cannot be said of any of the other park projects, which have met at least temporary defeat. It is to be hoped that most of them will not be revived.

## PRIMARY EDUCATION IN FORESTRY

IT has been thought by some that the development of forestry on a large scale in Germany is due to the fact that an autocratic form of government enables the rulers to impose upon the unresisting masses public measures of common benefit, while in a democratic country the instability of government and the influence of individual opinion will prevent the consistent development of any great constructive forestry policy.

What, then, shall we say of forestry in republican France, where both science and practice have been developed to fully as great an efficiency and with equal benefits to the people?

That stability of policy in forestry is necessary goes without saying. Trees cannot be grown unless the land on which they are produced is protected and managed for long periods under intelligent supervision for that definite purpose. Otherwise the forest will be destroyed by unregulated lumbering, fires, insects, disease, and grazing, or by the clearing of much land for indifferent and unprofitable agriculture that had better be devoted to forest production.

What we do not yet realize fully is that forestry in Imperial Germany rests on the same basis as it does in republican France, and on which it must eventually depend in this country—a *thorough education of children in the grade schools in the first principles of forestry*, and its true place in the economic life of the nation.

As the twig is bent, the tree is inclined. If the right conception of forestry is implanted in the mind of the child, his attitude towards it for the rest of his life will be equally free from that destructive bent which makes vandals of half-grown boys, and the equally unreasoning sentimental attitude of protection expressed in the poem "Woodman, spare that tree," which would deny the value and use of wood products to the community.

Some of the greatest difficulties that the advocates of rational State and National forest policies encounter are created by the attitude and opinions of influential men who are profoundly ignorant of forest economics, and in a spirit of cocksure self-assertion sometimes appear as

champions of legislation whose tendency is to cripple or destroy efficient and sound forest administration. As an illustration, during the consideration of a dangerous bill in the Philippine legislature recently, whose purpose was to combine the forestry department with that of lands and mines, an American of some prominence remarked, "What has the forestry department of the Islands ever accomplished—they haven't even pruned the trees!" Again, many of our best citizens can see but one, and that by no means the most important, aspect of forest production, namely, the æsthetic value of forests as parks. This type of enthusiast has effectually paralyzed the proper development of the state forests of New York, and if permitted full sway would render the economic use of every acre of National Forest land impossible. The intentions of these citizens are of the best, but they have utterly failed to understand the basic facts of forestry, which recognize *all* the uses of the forest in both æsthetic and industrial life. The remedy for this condition lies in a *better system of primary education on the value and uses of forests in the life of the nation.*

But what can we expect to teach a grade school pupil about forestry? An answer is found in the following statement by a young German of high school age, who has been a resident of this country since he was ten years old, but has never received any instruction in the subject except that which is given to all grade pupils in the schools of his native land.

"In the *third grade* I was taught the meaning of care for a tree and a forest. We were given a course in the growth and development of trees and forests. We learned that a tree is of great value to the country. It affords shade, consumes carbon dioxide and *yields lumber.* The abundance of trees means that the adjacent land will be fertile. I remember I was told that the massive foliage of the trees softened the downpour of torrential rains. The same foliage when dropped by the trees in the fall served as a fertilizer. Leaves, being a poor conductor of heat, preserve the moisture in the ground. *Forests increase the agricultural products of agricultural communities. Forests also have tremendous financial value in the lumber a forest will yield.* I was also shown the beauty of trees as well as their value in other respects."

When every citizen of a nation has such fundamental and *well balanced* conceptions of forestry—and when even an eight-year-old boy knows that the beauty of trees is only one feature, "as well as their value in other respects," is it any wonder that rational forest management, by which the forests are both *utilized*, and *renewed*, has taken the place of our primitive policies, which seek either to utterly destroy them or to preserve them intact?

Let us use every effort to introduce a short but effective course in forestry into every public school in the land. In this way only will the forest policies of our great country be built upon the rock foundation of popular intelligence and approval.

## THE PUBLIC DOMAIN AND THE STOCK-RAISING HOMESTEAD LAW

**I**N AMERICAN FORESTRY, October, 1916, page 619, a statement was given based on most recent investigations showing the extent of the public lands in western states, reserved and unreserved. Outside of the National Forests these lands are largely non-timbered, and non-irrigable, and can be used only for grazing.

For years the question of the proper policy for their management was debated in Congress. The struggle lay between the advocates of a leasing law permitting the Interior Department to administer grazing and to collect fees and the plan proposed of facilitating the private acquisition of these lands. By the latter method the lands would be placed on the tax list and would produce local or state revenues, either by taxes or later by confiscation for unpaid taxes, when the states could lease the lands and get the grazing revenue. Incidentally, such a law would greatly increase the business and the fees of the officials of the United States Land Office.

With the three great forces behind it, the desire of the individual for land, the desire of the state for revenue and the desire of the land office for business, nothing could stop the passage of the stock grazing law.

The law was safeguarded by stipulating that only non-forested and non-irrigable land could be filed upon and then only after the Interior Department had examined and designated it as land suitable only for the purpose of the law, namely, for stock grazing. Mineral rights were reserved to the Government. The area allowed to each individual is 640 acres.

But here comes the rub. Land which cannot be irrigated, lying in arid regions and not capable of dry farming, in other words, land of the character contemplated by this bill, will graze only one cow on from ten to forty acres, depending upon the local conditions. The average capacity is perhaps twenty acres, giving a herd of 32 range cattle as the possibility from which to make a living. To obtain title to this land, improvements worth \$1.25 per acre are required.

It is the judgment of stock raisers that fully 100 head of cattle are required to yield a competent living and this requires from four to ten sections of grazing land. If these facts are true, *the stock grazing law is based on a fundamental economic error* and only about one man in from four to ten of those who file on these homesteads and invest their time, health and capital in improvements can hope to win out, and then only by acquiring title to the lands of those who fail. But as these failures may not all prove up before quitting, an extended period of economic disturbance and adjustment will be inevitable, during which the present winter range for stock will be split up, fenced off and made inaccessible, to the disruption of the stock business as now conducted. Unless economic questions affecting the public welfare are settled on some other basis than immediate self-interest, the public inevitably pays the piper in the long run. In this instance, private interest has won. Let us hope that similar questions which may arise in the future will be looked at from a broader and more far-reaching standpoint.



# BUILDING BUNGALOWS

BY RAWSON WOODMAN HADDON

WHEN all other methods of arrangement for the interior of the house have failed, one may turn, with fair expectation of success, to the one-story type of building which we have come to know—quite improperly—by the name of “bungalow.”



FRONT ELEVATION OF HOUSE AT SOUTH RIVER, MARYLAND. AYMAR EMBURY II, ARCHITECT

A very general idea seems to be that this one-story house arrangement is so simple a problem that it need be by no means as carefully thought out and studied as a more formal type of residence; and a second unfortunate idea is that it is a cheap method of building. Both are serious mistakes.

In the first place, it is well to remember that in the “bungalow” there is more outer wall surface to be covered, and more roof area in proportion to the enclosed part of the building than in a house of two, let us say, or more stories in height. And it is probable that in the majority of cases the same accommodations in the number and size of rooms could have been secured at a somewhat

smaller cost in a two-story house, or a larger number of rooms might have been had in a two-story house for the same amount.

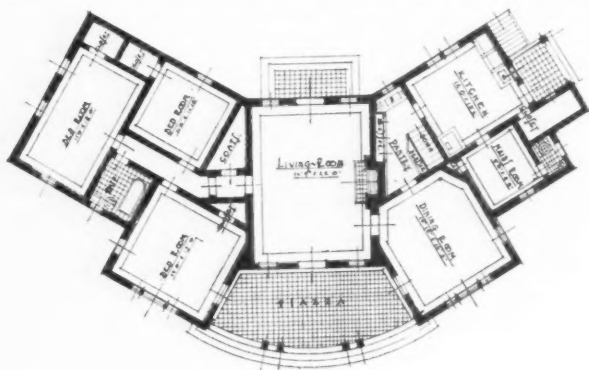
These items, of course, are naturally to be taken into consideration in estimating the comparative costs of a one- or two-story house, before deciding upon the type of plan to be used.

It is probable that we are in the habit of considering the “bungalow” type inexpensive because of the fact that in many instances, where the cost of erection has been low, the building itself was little more than a camp. In it the owners were, perhaps, satisfied with the barest accommodations and cheap workmanship and material of a kind that would not be tolerated if a larger or more permanent structure were used.

Even with the rooms of the house spread out on a single floor, the plan may be a failure notwithstanding many good points in favor of the general type. It may be its very simplicity, or what we take for simplicity, that so often lures us into a false sense of security and into a certain amount of carelessness and thoughtlessness in planning at the very points where the greatest care has been exercised in

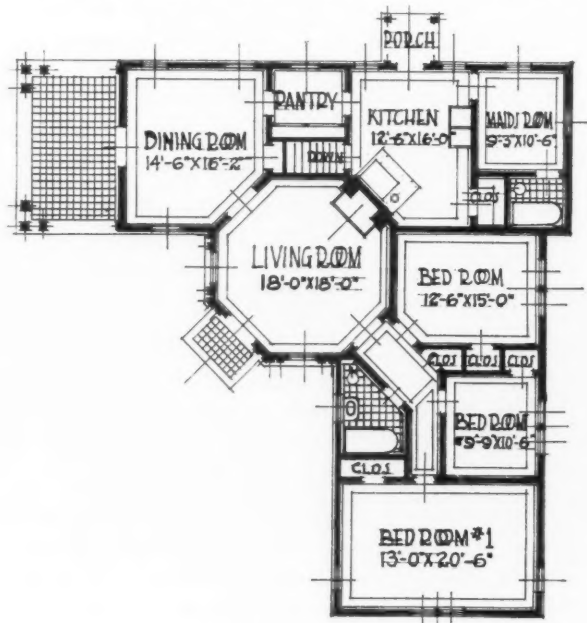
the successful examples of the type that the prospective builder may have seen and admired.

But the very fact of its simplicity in plan and in exterior design brings new problems and new chances for



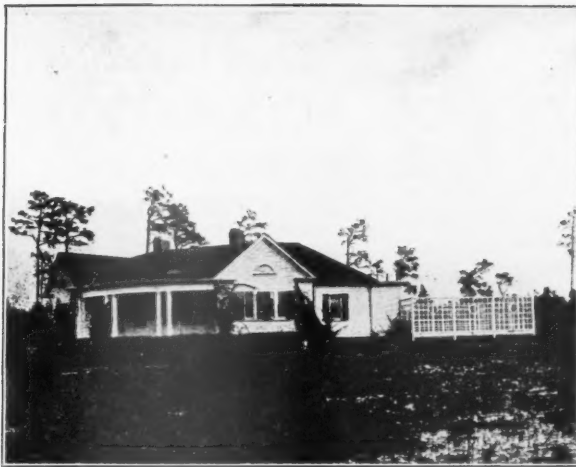
PLAN OF HOUSE NO. 1

At Southern Pines, North Carolina. Aymar Embury II, Architect.



PLAN OF HOUSE NO. 2

At Southern Pines, North Carolina. Aymar Embury II, Architect.



ELEVATION OF HOUSE NO. 1

At Southern Pines, North Carolina. Aymar Embury II, Architect.



ELEVATION OF HOUSE NO. 2

At Southern Pines, North Carolina. Aymar Embury II, Architect.

failure or success. At the same time, the advantages of the type are many.

There is the total absence of stairs, for instance, and an opportunity, in laying out the plan, of arranging the rooms in such a manner that important rooms may have two, if not three, walls with windows in them, assuring a constant cross-circulation of air. The most popular arrangement of rooms is that in which the living-room occupies a central unit of the plan, with wings or extensions at either side, in one of which is the service portion of the house, with the dining-room closely connected with it and adjoining the living-room.

On the other side of the central room in this plan are the sleeping-rooms, sleeping-porches, bath-rooms, etc. The natural advantages of this arrangement are obvious.

Being built usually on more or less isolated tracts of land, where the surroundings are more often trees, or at least broad expanses of lawn or field, the long, low lines of the house "fit" far more naturally and pleasingly into the landscape than the bulk of a higher and smaller building in ground area would.

Greater opportunities are given the designer by these conditions for interesting composition in his design. And—

always—the long, low, unbroken roof lines give the house a feeling of homelikeness that is seldom secured in buildings of greater height.

Here, again, we come face to face with a certain amount of wastefulness in the one-story arrangement of rooms. Taking into consideration the previously mentioned large expanse of roof necessary to cover the floor space below, we find ourselves with a large amount of room under the roof that, while it helps the general appearance of the house, is, however, not easily made use of, excepting possibly for storage or similar purposes.

The insertion of dormer windows here will immediately spoil the most interesting feature of the exterior design. If we raise the roof high enough to get room height and window space in the side walls below the roof, the character of the building is automatically and immediately changed, and we no longer have a one-, but a two-story house. Bed-rooms on the ground floor are now quite



REAR ELEVATION OF THE HOUSE AT SOUTH RIVER

Showing the office entrance and the court formed by the kitchen and bedroom wings.



FIRST FLOOR PLAN

PLAN OF THE HOUSE AT SOUTH RIVER, MARYLAND

Illustrating the most successful arrangement of the one-story house. Aymar Embury II, Architect.

## BUILDING BUNGALOWS

(Continued.)

unnecessary and we find ourselves with a conventional and—if the exterior design follows "bungalow" character and lines—a thoroughly unsuccessful and ugly house.

The buildings designed by Mr. Embury, and illustrated here, are successful examples of one-story houses erected in various parts of the country and arranged to meet the requirements of occupancy and location brought about by conditions of site and location, and by the widely differing personal needs of the families occupying them.

The object of the unusual arrangement in plan of the two Boyd bungalows at Southern Pines, North Carolina, for instance, was to get certain conditions of view and sunshine in the principal rooms, with the possible entrances from the street from what was practically the rear. These houses, which cost about six thousand dollars each, were built throughout of North Carolina pine. The clapboards were laid four and one-half inches to the weather and the shingles four inches. The framing timbers, interior and exterior door and window trim, the doors, floors, etc., are all North Carolina pine.

In addition to considerations of design, Mr. Embury used the material chosen because it was also the cheapest. "North Carolina pine down there," he says, "was then about seventeen dollars a thousand, while everything else was much higher."

The St. George Barber house at South River, Maryland, illustrates the central living-room type which has been mentioned as the most successful "bungalow" plan. The living-room is in the center of the building, with wings at either side in close connection with the central room and at the same time entirely separated from each other.

The dining- and bed-rooms all have exposures on three sides. The hall cuts off—by the simple closing of a door—the bedroom wing from the entire remainder of the house. The bath-room is especially well placed in its relation to the bed-rooms adjoining it.

If the room at the end of the wing, now used as an office, was used as a bed-room, some slight rearrangement of the bath-room fixtures would make it possible to enter the bath from the hall. A separate porch for servants is provided with an entrance to the kitchen.

This house was built for about eight thousand dollars. The shingles were laid in random widths, and the finish is much the same as in the Boyd houses.

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The bungalow above is described elsewhere in this issue. It is the work of one of America's best known architects, Mr. Aymar Embury, who has placed the stamp of his approval on a splendid wood by building it throughout of

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North Carolina Pine Association

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Norfolk, Virginia

### Weiss Takes New Position

Howard F. Weiss, Director of the Forest Products Laboratory, at Madison, Wisconsin, has resigned to accept a position with the C. F. Burgess Laboratories (Chemical Engineers), at Madison, and will engage in the development of products and processes involving a more profitable utilization of wood and timber. As director of the largest government laboratory in the world devoted to the study of wood, Mr. Weiss has had charge of numerous investigations in kiln drying, wood preservation, wood distillation, the manufacture of pulp and paper, the mechanical testing of timber, and the production of ethyl alcohol, turpentine, etc., which work has thrown him in direct contact with timber problems in the United States, Canada, Cuba and South America. Several of the government publications are written by him, and his book, "The Preservation of Structural Timber," is the most exhaustive written on this subject.

### Thrushes Destroy Insects

A study of six species of thrushes by the Biological Survey shows that the economic tendencies of these birds are in keeping with their other desirable qualities. They commit no depredations on crops, and destroy large numbers of insects.

## CANADIAN DEPARTMENT

### ELLWOOD WILSON, SECRETARY, CANADIAN SOCIETY OF FOREST ENGINEERS

Forest Protection for the woodlands of Quebec is making most satisfactory progress. All of the timberland owners in the valley of the upper Ottawa River have decided to join the Lower Ottawa Forest Protective Association. This will bring the territory patrolled by this association up to nearly fifty thousand square miles. The territory will be divided up into districts, each under the control of an inspector.

On March sixth, at the Chateau Frontenac, in Quebec, a meeting of the timberland owners on the south shore of the St. Lawrence River, from a point south of the City of Quebec to the end of the Gaspé Peninsula, was held under the chairmanship of Ellwood Wilson, President of the St. Maurice Forest Protective Association. The question of forming a new protective association for this region was thoroughly discussed, and it was decided to organize. A committee was appointed to draw up a constitution and by-laws. Later in the day this committee reported, and after a deputation had waited on the Minister of Lands and Forests to ascertain his position and what the Government would do to help the

new association, it was formally organized. Mr. Gerald Power, of the River Ouelle Pulp Company, was elected President, and Mr. Paul G. Owen, who has been for many years Secretary of the Quebec Limit Holders' Association, was made Secretary-Treasurer. The territory of this Association, which is to be called the Southern St. Lawrence Forest Protective Association, will comprise about twenty thousand square miles and will be divided into two sections, each with a board of five directors, with a vice-president and general manager. The Province of Quebec is now fairly well covered with protective associations, the only important section left out being the Lake St. John Region, and it is hoped that the limit holders in that section will soon follow the lead of the rest of the Province.

Another Forestry Battalion for use in England and France is being recruited in the Province of Quebec by Major H. J. Lyons, of the Canada and Gulf Terminal Railway. His acting chief engineer, Mr. E. S. Holloway, has enlisted as lieutenant. Major Lyons had already enlisted a railway construction battalion which is doing good service in France. These construction battalions are employed in France to keep the lines of communication following close up to the first line so that big guns, ammunition, men and supplies may be moved up rapidly.

Dr. Howe, of the University of Toronto, with two technical assistants, will commence for the Commission of Conservation and in coöperation with the Laurentide Company, Limited, a survey of the cut-over pulpwood lands. This survey will determine the amount of wood left after logging, the reproduction, rate of growth and probable yield of timber after a certain number of years, and will make recommendations as to improved methods of cutting.

The Belgo-Canadian Pulp and Paper Company, Limited, of Shawenegan Falls, Quebec, has decided to commence planting trees on its holdings, making the third large paper company to undertake such reforestation work.

The Canadian Forestry Association has just issued a very instructive and attractive little book, "Mon Premier Livre sur la Forêt," for distribution to school children throughout the Province of Quebec. It is most attractively gotten up, is about four and one-half by six inches, and is full of illustrations, showing well and badly managed forests, those undamaged and those damaged by fire, the destruction wrought by bombardments of forest areas in France, lumbering scenes, fire ranging work, erosion and so forth. The text is also exceedingly interesting and the whole book will be of great help in educating the young people about their most important natural resource and its proper care. The

association has also issued a small folder in both French and English, called the "Picture of Your Enemy," which, on being opened, shows an excellent colored picture of a forest fire and warns everyone to be careful.

Here, as elsewhere, it is being more and more fully realized that the greatest measure of protection for our forests comes through education. This has been so strikingly shown in the work of the St. Maurice Protective Association that further efforts are continually being made to educate and interest the people in this work and to secure the active coöperation of all who live in or near forested sections.

The new Forest Protective Department of the Province of Ontario is getting well into harness, and has made elaborate plans for good protection during the coming danger season. A fire tax will be imposed on timberland holders and everything possible will be done to give them first-class protection.

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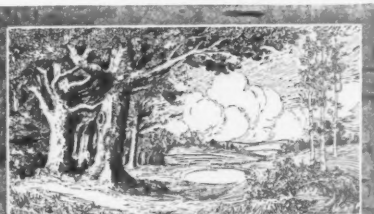
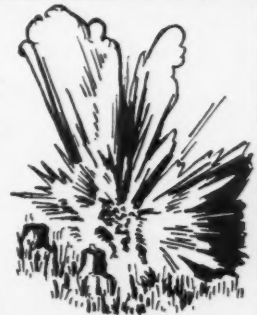
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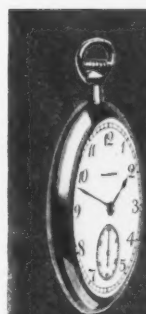
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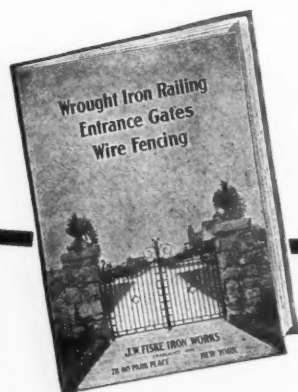
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